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TROPICAL DISEASES BULLETIN, VOLUME FIFTY

By

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The *Tropical Diseases Bulletin* enters its 50th volume with the present issue and although this does not mark a fiftieth anniversary, two volumes a year having been published up to 1921, it is thought appropriate to make this the opportunity for an account of the circumstances which gave rise to its publication ; and because I am the member of the staff with the longest service, having joined the Bureau in 1910, I have been asked to write this account.

The Bureau had its origin in an International Conference on Sleeping Sickness held in London, under the presidency of Lord Fitzmaurice, Under Secretary for Foreign Affairs, in June 1907 and March 1908, to concert measures for the control of that disease which was spreading rapidly in tropical Africa. It was then proposed to have a central international bureau " to extract and circulate all new literature on sleeping sickness ". This project fell through because the delegates were not unanimous as to the seat of the bureau. Arrangements were therefore made by Lord Elgin, then Secretary of State for the Colonies, for the establishment of a British Bureau, maintained from British funds, with a contribution from the Sudan Government. Lord Elgin appointed an Honorary Committee of Management for this new Bureau, and Sir David Bruce, Sir William Leishman, Sir Patrick Manson, and Sir Ronald Ross were among the early members.

The Royal Society, meanwhile, had agreed to house the Bureau, which began its work in a small apartment on the ground floor of the Royal Society's premises in Burlington House in the summer of 1908, under the direction of Dr. A. G. Bagshawe of the Uganda Medical Service, who had been Medical Officer in charge of the Sleeping Sickness Extended Investigations in the Uganda Protectorate from 1906. During the first four years of the Bureau's existence it issued 40 numbers of the *Sleeping Sickness Bulletin*, besides maps of the distribution of sleeping sickness and tsetse flies, popular pamphlets on the means of prevention of sleeping sickness, and an exhaustive bibliography of the literature of trypanosomiasis. In 1911 the Bureau began the issue of a quarterly *Kala Azar Bulletin*, on similar lines to the *Sleeping Sickness Bulletin*, and of this later publication 3 numbers and an introductory List of References appeared between October 1911 and July 1912.

It soon became evident that what the Bureau was doing for sleeping sickness and kala azar could be done in the same way for tropical diseases generally, and Lord Crewe, during his term of office as Secretary of State for the Colonies, and then his successor at the Colonial Office, Mr. Lewis Harcourt, interested themselves in plans for the expansion of the Bureau to deal with all exotic diseases prevalent in tropical and sub-tropical regions. The extra funds needed for the expansion were soon forthcoming. The Transvaal Government, having already heard in 1910 that such a proposal was on foot, sent a contribution of £500 to the Bureau in the names of the four Colonies of the South African Union ; later the Governments of the Union of South Africa and of India agreed to make annual contributions, and an appeal sent by the Colonial Secretary to ten Colonies brought further annual contributions which enabled the expansion to go forward. Subsequently other Colonies became annual contributors, and this willingness of overseas Governments, and particularly of Colonial Governments, to support the Bureau's work and to increase the amounts contributed when the need arose because of rising costs, made possible the continued development of the Bureau.

In the autumn of 1912 we moved to the Imperial Institute building in South Kensington, and the *Sleeping Sickness Bulletin* and the *Kala Azar Bulletin* gave place to the *Tropical Diseases Bulletin*, of which the first issue, edited by Dr. Bagshawe, appeared in November 1912. It contained abstracts of recent papers arranged under the headings of kala azar, malaria, blackwater fever, relapsing fever and sleeping sickness. In later issues other diseases were added, so that the results of the most recent researches on every tropical disease in every country, new methods of treatment, improved means of protection and other observations were quickly made available.

Each issue of the *Sleeping Sickness Bulletin* had contained a full account, written by Dr. Bagshawe, of the progress of current work in the field and laboratory on sleeping sickness and other trypanosome diseases. When the *Tropical Diseases Bulletin* was started in 1912, Dr. Bagshawe, besides acting as general editor, continued to abstract papers on sleeping sickness as he had done for the *Sleeping Sickness Bulletin*, and Dr. C. M. Wenyon, who had been sub-editor of the *Kala Azar Bulletin* during its short existence, continued with this subject in the new *Bulletin*. For other subjects Dr. Bagshawe enlisted the help of a number of distinguished experts, and among the earliest of these, and happily still living, were Professor Edward Hindle who abstracted papers on relapsing fever, and Professor R. T. Leiper who dealt with the subject of helminthiasis.

In 1914 special sanitation numbers were embodied in each volume of the *Tropical Diseases Bulletin* and these were later developed into special *Sanitation Supplements* enjoying a separate publication from 1920 to 1925. In 1926 the *Sanitation Supplements of the Tropical Diseases Bulletin* gave place to the *Bulletin of Hygiene* which is now in its 28th volume and forms a complementary publication to the *Tropical Diseases Bulletin*.

Dr. Bagshawe, who was knighted in 1933, continued as Director of the Bureau up to August 31, 1935 when he was succeeded as Director by Dr. (now Sir) H. Harold Scott, who retired in 1942.

SUMMARY OF RECENT ABSTRACTS*

I. CHOLERA

Epidemiology

BANERJEA (p. 140) brings out the point that in India there are endemic areas which form the reservoir of infection, but that such true endemic foci do not exist in Uttar Pradesh (late United Provinces) in spite of the fact that great epidemics have long been associated with the fairs and festivals held there, especially in the period May–October when absolute humidity is high. He shows the great diminution in the incidence which has taken place since inoculation with cholera vaccine was made compulsory for all persons attending the Hardwar fair in 1945 and again in 1950. In general the primary requirements, protected water supplies and efficient methods for disposal of refuse and faeces, are specially needed in the endemic areas which form the reservoir of infection. SWAROOP and RAMAN (p. 140) write in a similar strain. They found no evidence that the level of endemicity is high around the pilgrim centres, and in spite of major epidemics arising from these centres, infection does not persist materially in the neighbourhood of many of them. The explanation of endemicity of cholera must be sought elsewhere than in the occurrence of fairs and festivals.

SWAROOP (p. 390) has made other studies on the endemicity of cholera, by three methods which he describes. He found that the endemic areas are located generally near rivers, in areas of high population density, low-lying, and having high absolute humidity. It seems that the connexion with water systems deserves close attention. The author notes that cholera tends to persist in two groups of districts in which the important pilgrim centres of Hardwar and Nasik are situated. Further study of this question in two groups of districts in the Madras Presidency, in which cholera tends to persist, shows that in one, where there is copious irrigation, there is great opportunity for contamination and the people drink the channel water. In this area the standard of living is low and there is much migration into the area by people in search of work, and by pilgrims. SWAROOP (p. 392) states that these conditions are likely to flood the area with infection and contaminate the water system. The other area is also irrigated, but the drinking water supply is better. The author recognizes the interplay of factors which favour infection and factors which are adverse to infection in determining the endemicity of an area.

The WHO Expert Committee on Cholera (p. 949) has issued its first report, in which the examination of stools and water for *Vibrio cholerae*, serological studies, and other matters are discussed. An important investigation carried out in Calcutta in 1950 indicates that the longest period of continuous daily excretion of *V. cholerae* in convalescents was 15 days, and the longest intermittent excretion 25 days. Persistence of the vibrio in stools was usually short and intermittent. The general opinion was that contact carriers do not play a significant rôle in the spread of infection. The committee emphasized the importance of sanitary measures in the control of cholera.

Aetiology

FELSENFELD *et al.* (p. 142) have studied different media for growth of *V. cholerae*. For isolation they advocate streaking 2 plates each of alkaline agar and Aronson's medium directly with stools, and inoculation of alkaline

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1952, v. 49. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

selenite-F and Gohar's alkaline peptone broth with faeces, streaking on to alkaline agar and Aronson's medium after incubation for 24 hours.

PARIS and GALLUT (p. 395) have investigated the power of sodium citrate to support the growth of vibrios, and conclude that the sodium citrate test in the Simmons medium is a useful additional presumptive test for *V. cholerae*.

MINCK and MINCK (p. 142) describe dwarf forms (L forms) of *V. cholerae*.

KAUFFMANN (p. 1114) has examined the antigenic structure of *V. cholerae* in view of recent reports that more forms exist than were originally described. He concludes that many of those forms cannot be confirmed, and that only two types should be distinguished, namely Inaba (formula AC) and Ogawa-Hikojima (formula AB(C)). In cross-absorption tests Ogawa and Hikojima strains were found to be identical. He could not demonstrate the antigens D to M which have been described by BURROWS *et al.* and by GALLUT. The author discusses possible technical sources of error in work of this kind.

Some strains of *V. cholerae* which to all appearances are typically smooth, are sometimes found to react with rough " O " cholera serum, which indicates partial roughness. GURKIRPAL SINGH and AHUJA (p. 949) state that such strains should not be used for vaccines, and describe a new test for the detection of roughness.

In 1940 YU found that certain non-cholera vibrios isolated from river water in Shanghai had acquired serological characters of true *V. cholerae* after 5 intraperitoneal passages in mucin suspension in mice. GALLUT (p. 393) has investigated this possibility with water strains isolated during the epidemic in Egypt, but has failed to find evidence to support Yu's conclusion that the changes observed might account for the occurrence of an epidemic without importation of fresh infection.

Clinical findings

AHUJA *et al.* (p. 394) have issued a note on bacteriological procedures in the laboratory diagnosis of cholera. They discuss the collection of specimens, microscopic examination, cultural examinations and the identification of *V. cholerae*. Details are given in the original abstract.

An elaborate biochemical investigation of the blood in cholera is reported by SAHA and DAS (p. 46), who found a total fluid loss of about 2·3 litres, of which 0·8 litre was from plasma and 1·5 litres from the interstitial spaces. The average loss of sodium from the intracellular fluid was 11·6 gm., and some of this would have been in the form of bicarbonate, which means a depletion in alkali reserve. This is a factor in the production of acidosis. From detailed examinations made on cholera stools, the same authors (p. 1115) conclude that the physical and chemical characters resemble those of plasma minus its protein. The fluid is a transudate. CHAUDHURI *et al.* (p. 951) have studied the reduction of plasma volume and interstitial fluid in cholera, and note the marked decrease in total quantity of circulating chloride.

DE *et al.* (p. 618) have studied the effects of injecting intraperitoneally a suspension of heat-killed washed *V. cholerae* into rabbits. The minimum lethal dose per kgm. of body weight was 100 million organisms in 1 ml. The injection caused a fall in blood pressure, haemoconcentration, and effects on the intestine, kidneys and heart. These are attributed to cholera toxin.

DE *et al.* (p. 1116) report a case of cholera with signs of haemolysis, although the vibrio isolated was not found to be haemolytic. It is possible that an endohaemolysin is liberated from the vibrio, to cause intravascular haemolysis.

Treatment

LAHIRI (p. 690) treated patients whose blood pressure failed to recover under treatment with intravenous salines and with circulatory stimulants, giving

them a special gelatin preparation intravenously. The results cannot easily be assessed.

In a small trial of intravenous aureomycin in cholera, SEAL *et al.* (p. 395) could not find any therapeutic benefit.

OLEJNIK and DAVIDOVITCH (p. 143) show that terramycin was effective when given up to 5 hours (but not 7 hours) after infection of mice with various strains of *V. cholerae*. Chloramphenicol was not so successful in the much larger doses used 5 hours after infection. In man, DAS *et al.* (p. 691) show that treatment with terramycin by mouth caused rapid disappearance of *V. cholerae* from the stools but did not affect the clinical course of the disease. KONAR and SENGUPTA (p. 691) arrive at a similar conclusion.

NAGAO (p. 265) reports the discovery of roseomycin, an antibiotic with particular activity on *V. cholerae*.

PANDIT (p. 396) sums up the results of the trials of bacteriophage for the treatment and prevention of cholera, which were made in Assam from 1929 onwards. The general opinion was that, although it had some value in treatment, this was probably no greater than by any other recognized method, and that in prevention bacteriophage should not replace the well-known public health measures.

Control

KANT (p. 266) reports the results of a campaign of inoculation in a group of Indian villages, which show advantage from the procedure, but in comment Taylor points out that the campaign was superimposed on a declining epidemic, and that on the information given it is doubtful if valid conclusions can be drawn.

GOPAL (p. 692) sums up the experience of inoculation of persons attending the great fairs, which indicates that it is immensely successful if made compulsory. Voluntary inoculation, which is accepted by only a minority of pilgrims, has often failed to prevent outbreaks. The provision of adequate sanitary arrangements and controlled water supplies should also be compulsory.

Charles Wilcocks

MALARIA

PEEL, E., MESTDAGH, M. & MATHIEU, J. Note sur la fréquence du paludisme et des filarioses au Centre extra-coutumier de Costermansville. [**Note on the Incidence of Malaria and Filariasis in the** *" Centre Extra-Coutumier "* **at Costermansville**] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 269–74.

At the end of the dry season in August to October, 1951, a survey was made of the incidence of malaria and filariasis in this particular centre near Costermansville, Belgian Congo, of a population of 25,000.

The number examined was 2,117, which was considered to be representative of the total population. The methods used were the usual ones of thick blood films and skin scarification.

The predominant malaria parasite is *Plasmodium falciparum* ; *P. malariae* was noted but *P. vivax* and *P. ovale* were absent. Altogether, 435 were examined by thick blood film and 1,682 by skin scarification.

The results are tabulated according to age-groups 0–2 years, 2–9 years, 10–14 years, 15 years and over. The average malaria parasite rate was 1·9 per cent., with the highest (5·7 per cent.) in the 2–9 age-group and the lowest

(0·9 per cent.) in the 15 and over age-group. A further division of the numbers examined into residents of less than 2 years and of over 2 years showed a higher parasite rate (4 per cent.) for malaria in the newcomers compared with the more permanent residents (1·1 per cent.). The age-group 2–9 years of the newer residents showed a parasite rate of 25·8 per cent. All these results are low in this area, considered hypoendemic for malaria. They are an improvement on the 1939 figures recorded by Professor SCHWETZ, owing most likely to the use of residual insecticides for a period of 3 years and to a decrease in the number of immigrants.

Of those examined by the skin scarification technique for microfilariae, 25·2 per cent. were *D. perstans*, 3·2 per cent. *L. loa*, 4·6 per cent. *O. volvulus* and 3·6 per cent. *streptocerca*.

The authors believe that *D. perstans* is contracted locally within the area but that the remaining filarial infections have been acquired outside its confines. Likewise, from their observations, they believe that very little transmission of malaria occurs within the area. *R. Ford Tredre*

WELCH, Sarah F. & QUINBY, G. E. **Epidemiologic Appraisal of Malaria in the United States during 1951.** *Amer. J. Trop. Med. & Hyg.* 1952, Sept., v. 1, No. 5, 736–42.

" 1. Except for the increases due to service personnel returned from Korea, reported malaria morbidity has continued to decline in the nation during 1951.

" 2. Epidemiologic appraisal of malaria occurring in 1951, in 11 of the 13 eradication States, showed 9 parasite-positive cases in which no clear source of natural infection outside the United States was discovered, 8 of these being regarded by State epidemiologists as primaries and the other as a relapse. The primary cases occurred in five states : Arkansas, Missouri, South Carolina, Tennessee, and Texas.

" 3. In Arkansas, Missouri, and South Carolina, one or more primary cases in United States residents were believed to have originated from Korean cases associated in time, place, and person on military bases. In Missouri 3 primary cases were discovered, 2 on military bases and 1 in a civilian in St. Louis.

" 4. Five of the 13 eradication States will be 3 years or more in meeting the criterion of cessation of endemicity of malaria defined by the National Malaria Society."

KARTMAN, L. & MAYS, Bettye M. **Malaria Blood Survey of Mexican Laborers in an Arkansas County.** *Pub. Health Rep.* Wash. 1952, June, v. 67, No. 6, 561–2.

For over 25 years, Mexicans have worked as transient agricultural labourers in the Mississippi Delta area : more recently the numbers have increased and larger numbers are expected in the future. Most of these workers, of recent years, have come direct from Mexico, where there are many areas of endemic malaria. As the immigrant labourers are exposed to large numbers of *A. quadrimaculatus*, the authors, in Arkansas, carried out a study designed to discover whether these Mexicans carried malaria parasites.

Between June and July, 1951, 1,022 blood films were examined for parasites : they represented more than 94 per cent. of the Mexican workers employed on plantations by a large local cotton-growing organization.

There were 24 Mexican states represented in addition to the Federal District. The distribution of the men according to states is shown in a table, which also indicates the percentage having a positive history of malaria, and the morbidity and mortality rates (1947–1951) per 100,000 in each state concerned.

While 5 per cent. gave positive histories of malaria, not a single positive blood film was found. Although this may suggest that there is little danger of transmission of malaria from these immigrants, it is suggested that recruits from Mexican states where malaria is endemic might be examined for parasites *en route* if their history or clinical features suggest recent malaria.

H. J. O'D. Burke-Gaffney

RENJIFO, S. & DE ZULUETA, J. **Five Years' Observations of Rural Malaria in Eastern Colombia.** *Amer. J. Trop. Med. & Hyg.* 1952, July, v. 1, No. 4, 598–611, 3 figs. [13 refs.]

The observations in this paper are confined to the Colombian Llanos, an area bounded by the Eastern Andes in the west, by the border of Venezuela and to the south by the Macarena mountains and Guaviare River. These plains are grass covered with forest localized to the vicinity of rivers or other collections of water ; between this type of terrain and the Andes slopes is an intermediate zone with a different and peculiar vegetation 20 to 30 km. in width. Records show at Villavicencio, close to the Andes, a high seasonal rainfall, 175 inches per year, with corresponding high relative humidity but an even temperature through the year averaging 26·3°C. (79°F.) ; the altitude is below 500 metres ; away from the mountain front the rainfall lessens but is never less than about 60 inches per year. The population is scanty and scattered in isolated ranches or forest clearing dwellings ; mud walls and thatched roofs of palm leaves form the usual mode of construction ; 150,000 people are scattered over 162,700 sq. miles of territory, less than one per sq. mile.

Twenty-eight anopheline species have been found, of which *A. darlingi* is the malaria vector with a record of 14 positives in 794 dissected or 1·8 per cent. Of the 28 species mentioned, few come in contact with man ; *A. darlingi* is the most frequent house haunter but limited to certain areas ; elsewhere *A. albitarsis* and *A. pessoai* are commonly caught indoors. Despite uniform climatic conditions through the year a clear annual cycle occurs among the individual anopheline species. *A. darlingi* is mainly found in the transitional zone mentioned above as adjacent to the mountains but it does occur out in the savannah. In this zone, which has been developed to some extent for agricultural purposes, the breeding places are frequently man-made ; elsewhere permanent or semi-permanent lagoons adjacent to forest and savannah are breeding places so characteristic as to be recognizable in air photographs. Field studies indicate a clear preference for man rather than animal in respect of blood feeds ; this habit makes *A. darlingi* an effective vector even when much outnumbered by other anophelines. Nevertheless, at the foot of the uninhabited forest of the Macarena *A. darlingi* is relatively abundant without contact with man. For this reason the authors believe that in the zones close to the moutains where *A. darlingi* is firmly established the use of residual insecticides would fail to eradicate the mosquito.

Malaria surveys have been conducted and details are given in tables. Spleen indices are low in urban areas and in rural districts where *A. darlingi* is absent (0–10 per cent.) ; there is not much seasonal fluctuation ; 30 per cent. is common in the *A. darlingi* areas. Some observations showed a spontaneous reduction of malaria over several years unassociated with any form of control. Where residual DDT has been used by accepted methods and dosage, spleen and parasite rates have fallen in 4 years to single figures. Observations by stable trap captures on the populations of other anophelines show that residual DDT, applied to human dwellings only, caused in some way over the years a marked reduction in 6 species whereas 3 others showed a marked increase.

R. Ford Tredre

LIPS, M. A. H. Index plasmodique et mansonioides infectés. [**The Malaria Parasite Index and Infection of** *Mansonioides*] *Ann. Soc. Belge de Méd. Trop.* 1952, Aug. 31, v. 32, No. 4, 389–90.

The discovery of natural non-human malaria infections in the salivary glands of different anophelines indicates the need for caution in the interpretation of the sporozoite index in the study of human malaria. The demonstration by the author with VINCKE that *Anopheles dureni* is a natural vector of *P. berghei* [this *Bulletin*, 1951, v. 48, 714] is a case in point. The question is therefore posed whether the infection of vectors of human plasmodia, such as *A. funestus* and *A. gambiae*, could not also partly be explained by the presence of animal strains.

During prophylaxis with Daraprim in Kasango, Belgian Congo, the sporozoite index in vectors of human malaria was reduced to negligible proportions and the parasite index in man became negative, although gametocytes were found in people passing through the village [*ibid.*, 1952, v. 49, 751].

The author argued that as sporozoite infection of culicides other than anopheles would be certain evidence of the existence locally of a non-human strain of parasite, it might be asked whether the infection of anophelines was not of the same origin.

With a Shannon trap, specimens of *A. funestus* and of *Mansonioides uniformis* were caught and allowed to bite African volunteers. On dissection, one gland of *A. funestus* was positive, but the salivary gland infection of *Mansonioides* was about 2 per cent. (apparently the first record of infection of this species).

As *Mansonioides* is not a vector of human malaria, it is clear that the sporozoites found in it were not of human origin : it might well be that the sporozoites found in *A. funestus* also came from the same non-human source. These findings were confirmed in villages near Kasango and also in distant ones.

It is believed that *P. berghei* was not the species of parasite involved, as inoculations of laboratory rodents with the sporozoites found were negative. The studies are being continued. *H. J. O'D. Burke-Gaffney*

WALKER, A. J. **Laboratory Diagnosis of Malaria.** *Amer. J. Clin. Path.* 1952, May, v. 22, No. 5, 495–500.

Thick blood films are stained by the following method : Dip in methylene blue solution (1 part medicinal dye, 3 parts anhydrous disodium hydrogen phosphate, 1 part potassium dihydrogen phosphate in 300 ml. water) for one second, wash in distilled water. Place face downwards in Giemsa stain (1 drop of Giemsa per ml. of buffered water—7 parts Na_2HPO_4, 4 parts KH_2PO_4 in 500 ml. water) for 6 to 8 minutes ; dip in distilled water.

Some useful hints on the disease and parasites follow : a person who has not been outside the U.S.A is unlikely to have malaria ; there is no justification for the " therapeutic test " ; if a thick film is negative morning and evening on 3 successive days the symptoms are not due to malaria ; species diagnosis of scanty infections is better made on the general behaviour of the infection than on the appearance of the parasite ; it is nearly always unnecessary to wait until the temperature rises before taking a blood film.

The disease is classified into 2 entities—(1) *falciparum* and (2) *vivax* or *malariae*, or both. In the first, only young parasites and gametocytes are found in the peripheral blood, the pre-erythrocytic stage is exhausted in the primary attack, gametocytes appear later and the attack is readily cured without relapses. In the second, all stages of parasites are found in the peripheral blood, the liver forms persist after the primary attack, gametocytes accompany the asexual infection and relapses occur.

Although parasite development is synchronous, even in the presence of multiple infections (one of which dominates the other), not all parasites keep to the strict time-table ; broods sporulating between the paroxysms are however suppressed, *i.e.*, out-of-step broods are eliminated with the result that only one matures each day. *P. C. C. Garnham*

Lahitte, F. G. Rupture de rate palustre au cours d'un accouchement dystocique. Césarienne et splénectomie. [**Rupture of a Malarial Spleen during a Difficult Labour, with Recourse to Caesarian Section and Splenectomy**] *Méd. Trop.* Marseilles. 1952, July–Aug., v. 12, No. 4, 454–6.

Himpe, N. E. & Pierquin, L. Un essai de prophylaxie antipaludique en milieu rural indigène. [**Experimental Malaria Control in a Rural Area**] *Inst. Roy. Colonial Belge. Sect. des Sci. Naturelles et Méd. Mémoires.* (Collection in −8°.) 1952, v. 20, No. 3, 55 pp., 1 map, 4 figs. on 2 pls. & 3 graphs.

The object of this study was to determine the extent to which periodic spraying of African huts with DDT is capable of reducing malaria infection rates of children aged 0 to 10. Ten posts or villages in the neighbourhood of Popokabaka, Belgian Congo, were chosen for the experiment ; they all had high malaria infection rates. Four spraying operations of all houses were carried out in July and October, 1948, and in January and April, 1949. Thick blood drops and smears were taken in May and November, 1948, and in May, 1949.

A " Four Oaks " spraying machine and a suspension of wettable DDT were used, 2 gm. of DDT per square metre. The methods employed are described in minute detail ; the whole operation was carried out with meticulous care. The cost was high. Experience showed that it was indispensable to place a European in charge of the spraying work. Taking this into account the cost of the 4 sprayings worked out at 33·12 francs per head of the 2,190 inhabitants it was desired to protect.

The villages are surrounded with forest and adjacent to a river, the Kwango or one of its tributaries. The facilities for mosquito breeding are very abundant. Most of the huts are constructed of straw and there is always a gap between the walls and roof of the hut. In these circumstances it is not surprising that the fall in malaria infection rates was insignificant. The fall in the parasite rates from first to last was about 10 per cent. There was a decline in the number of malaria patients treated in the dispensary. *Norman White*

Floch, H. Lutte Antipaludique et Lutte Antiamarile en Guyane Française. Déroulement de la troisième campagne de pulvérisations d'insecticides à effet rémanent dans les habitations. [**Control of Malaria and Yellow Fever in French Guiana. Third Stage of the Campaign with Residual Insecticides**] *Arch.Inst. Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 251.* 1952, Jan., 71 pp., 8 figs. [22 refs.]

This detailed 71-page report on the use of residual insecticides in French Guiana describes the third phase of the campaign which commenced in 1949. The principal town, Cayenne, and the urbanized areas of the coastal district were treated in the first and second phases ; the third phase, the subject of this report, included the remaining inhabited zones of this extensive territory.

Chapters are devoted to quantities of insecticides applied, personnel involved and the costs of the campaign. Insecticides were applied to human and animal habitations by the usual methods and apparatus and at the accepted dosage of 2 gm. of DDT per sq. metre of wall surface : 50 per cent. DDT wettable powder

was used and 5 per cent. DDT in kerosene for " finished " surfaces. As an alternative to DDT wettable powder, Gammexane dispersible powder P.520 was also used.

The results were most striking. There was a 95 per cent. decrease in the incidence of malaria, 80 per cent. of which is due to *P. falciparum* ; *Aëdes aegypti* disappeared completely from the urbanized areas and there was a marked reduction in the population of *Culex fatigans* and *Musca domestica*. Representatives of the Pan-American Sanitary Bureau, after an extensive search, were unable to find either larvae or adults of the *Aëdes aegypti* in 1951.

Statistics are quoted showing the improvement in the birth and death rates and the resultant saving in hospital expenditure on treatment of malaria.

Although the population of *Anopheles darlingi* has been very heavily reduced it is stated that cessation of the use of residual insecticides is followed closely by a resurgence of breeding by this mosquito ; its eradication is therefore unlikely. It is a forest mosquito : in Cayenne, the common anopheline is *A. aquasalis*. Insecticides used were not so effective against *C. fatigans* and *M. domestica*, and the authors believe that the latter insect has developed some degree of resistance to insecticides but, to date, it is still considered that the house-fly is " controlled " in numbers, but certainly not to the degree originally envisaged. [The methods used and the results obtained in French Guiana are comparable to those obtained in British Guiana. This very detailed report would be of considerable value to Health Officers embarking on such a campaign in other parts of the tropics and would need, therefore, to be consulted in the original.] *R. Ford Tredre*

Jaswant Singh, Ray, A. P., Nair, C. P. & Basu, P. C. **Isolation of a Strain of *P. inui* from Mixed Infection in Malayan Monkey.** *Indian J. Malariology*. 1951, Sept., v. 5, No. 3, 433–45, 3 charts. [20 refs.]

Defibrinated oxalated blood from two *Macaca irus* monkeys from Malaya was inoculated into local rhesus monkeys at the Malaria Institute of India. Extremely scanty infections of a malaria parasite were subsequently detected, and it was only after repeated passage and splenectomy that parasitaemia reached a high level. At first, the parasites appeared to be exclusively *Plasmodium cynomolgi* ; later, when the infection was heavier, a second species was observed, and, by inoculating blood at the moment when schizonts of the latter were mature, this second species was isolated in pure form. Morphologically, the parasite resembled *P. inui* and the identity was confirmed by finding that it had a 72 hours' cycle in the blood, mature schizonts appearing at 2 p.m. and young rings at 6 p.m. every fourth day. In the early passages and after splenectomy, the trophozoites showed curious filiform cytoplasmic processes—a phenomenon perhaps due to residence of the parasite in an abnormal host. The pathogenicity of this strain of *P. inui* was compared with the old one which has been maintained in the authors' laboratory for 17 years. The peak of infection after intravenous inoculation was reached on the 11th day in both, but the intensity and severity of the infections was much higher in the original strain. *P. C. C. Garnham*

Levaditi, J. C. Possibilité de conserver *Tr. congolense* et *Pl. berghei* à −70°C. [**Preservation of *Trypanosoma congolense* and *Plasmodium berghei* at −70°C.**] *C.R. Soc. Biol.* 1952, Feb., v. 146, Nos. 3/4, 179–81.

A description is given of the method and result of preservation of mouse strains of *Trypanosoma congolense* and *Plasmodium berghei* by freezing. The

infected blood was removed with sterile precautions and mixed with 0·2 per cent. heparin, to prevent coagulation. It was then distributed in ampoules, which were sealed and frozen immediately in a mixture of alcohol and solid carbon dioxide, after which the ampoules were placed in a Dewar flask containing the freezing mixture, the temperature of which was maintained by daily additions of solid CO_2. As the parasites and the erythrocytes are lysed if the frozen ampoules are heated gradually, it is essential that they should pass from —70°C. to +37°C. without delay. This is effected by placing the ampoules in a water bath at 37°C. immediately after removal from the freezing mixture. An examination of the contents of the ampoules in Giemsa-stained films revealed a variable number of normal parasites, as well as lysed ones, while their viability was determined by examination of fresh preparations and by inoculation of the blood into mice.

In the case of *T. congolense*, 20 per cent. of the trypanosomes regained their motility after having been frozen for 15 days, and 5 per cent. after 50 and 100 days. They produced in mice infections of typical virulence but with longer incubation periods. As regards *P. berghei*, it was viable and infective to mice after 15 days. *C. A. Hoare*

FABIANI, G. & FULCHIRON, G. Démonstration et analyse de l'immunité croisée entre deux souches de *Plasmodium berghei*. [**Cross-Immunity between Two Strains of** *Plasmodium berghei*] *C.R. Soc. Biol.* 1952, Mar., v. 146, Nos. 5/6, 435–7.

The object of this investigation was to determine whether there was any cross-immunity between different strains of *P. berghei*, similar to that between malaria parasites of man and other animals.

For this purpose two strains (I and II) of *P. berghei* differing in virulence and in gamete-production were used to infect white rats. In one series of experiments, rats immunized against one of these strains (after spontaneous recovery from the infection, with or without subsequent hyperimmunization with the same strain) were challenged with the other strain. Reinfection with the heterologous strain failed in all cases. The mechanism of this cross-immunity was analysed by intraperitoneal inoculation of immunized rats with massive doses of erythrocytes parasitized with the heterologous strain. This method was based on a previous demonstration [this *Bulletin*, 1952, v. 49, 670] that, in reinfections of immune rats by the intraperitoneal route, the parasitized red cells of the donor can be distinguished from those of the recipient, since the former are represented by large polychromatophiles containing several parasites, whereas the latter are small acidophile cells containing a single young parasite. This method was used by the authors to study the behaviour of the heterologous strain in superinfections. It was found that in some rats none of the heterologous parasites found their way into the recipient's blood, while in others they produced only a slight and transient parasitaemia (maximum 48 hours). The degree of resistance to superinfection proved to be similar to that produced by reinfection.

In another series of experiments, rats recovered from an infection with strain II were challenged successively with strains I and II (in both cases by massive intraperitoneal inoculations). It was shown that while the heterologous strain persisted in the blood of these animals up to 48 hours, the homologous strain either did not establish itself or multiplied for a shorter time than strain I. It was thus evident that the immunity against the homologous strain was reinforced by superinfection with the heterologous one.

C. A. Hoare

FABIANI, G., VARGUES, R. & FULCHIRON, G. Résultats de l'injection, par voie intra-cardiaque ou intra-péritonéale, chez la souris blanche, de quantités importantes de globules rouges parasités par *Plasmodium berghei*. [**Effect of Massive Inoculations of *Plasmodium berghei* into Mice by the Intracardial and Intraperitoneal Routes**] *C.R. Soc. Biol.* 1952, Mar., v. 146, Nos. 5/6, 437–40.

In the case of rats, the authors have previously shown [this *Bulletin*, 1952, v. 49, 670] that by massive intracardiac and intraperitoneal inoculation of *P. berghei* the incubation (prepatent) period can be suppressed and the parasites detected in the blood shortly after inoculation. Moreover, the parasitized erythrocytes of the donor can be readily distinguished from those of the recipient [see above].

In the present paper the authors record the results of similar inoculations in white mice. It was found that intracardiac inoculation suppresses the incubation period, while intraperitoneal inoculation reduces it to several hours. However, the application of this method in mice is not as practicable or striking as in rats : first, because the intracardiac inoculation is difficult to perform and is accompanied by a high mortality rate ; secondly, because intraperitoneal inoculation produces only slight and irregular parasitaemia ; and lastly, because it is difficult to distinguish the erythrocytes of the donor and recipient mice.

C. A. Hoare

FABIANI, G. & GRELLET, P. Etude chez le rat blanc des rapports entre la carence en vitamine A et le paludisme expérimental à *Plasmodium berghei*. [**Relations between Vitamin A Deficiency and Infection with *Plasmodium berghei* in Rats**] *C.R. Soc. Biol.* 1952, Mar., v. 146, Nos. 5/6, 441–4.

The effect of vitamin A deficiency upon infection with *Plasmodium berghei* was studied in white mice which were maintained on a diet fully or partially deprived of this vitamin, while in a control group the diet was supplemented daily with 15 vitamin units. The rats were inoculated intraperitoneally with blood containing variable numbers of infected erythrocytes. It was shown that total or partial absence of the vitamin did not aggravate the malarial infection ; on the contrary, the course of the acute phase was milder and the latent infection of shorter duration than in the controls. On the other hand, the malarial infection aggravated the symptoms of vitamin deficiency, in that the ocular disturbances were accentuated or made their appearance earlier.

C. A. Hoare

ALVAREZ, D. A., Jr. **Phagocytosis and Destruction of *Plasmodium gallinaceum* by Cells of the Reticulo-Endothelial System.** *Amer. J. Hyg.* 1952, July, v. 56, No. 1, 31–8. [20 refs.]

An account is given of the effect of phagocytosis on *Plasmodium gallinaceum*, which was studied as follows. By intraperitoneal injection into chickens of an irritant (aleuronat), a large yield of phagocytes was obtained, their number reaching a maximum 72 hours later. Each of the birds thus treated was then inoculated intraperitoneally with 1 ml. of blood containing upwards of 2 million parasitized erythrocytes suspended in 2 ml. of heparin-Ringer solution. After 24 hours the chickens were anaesthetized, their peritoneal cavity was exposed, and washed with the same solution. Then the fluid was removed and its cellular contents were examined microscopically. It was found that, on the average, the percentage of phagocytosis was 92·5. After the peritoneal cavity was closed the birds recovered from the anaesthetic, and subsequently all developed malaria.

In order to study the fate of the phagocytized parasites, these were removed singly (with the help of a micromanipulator) from the peritoneal exudate of birds similarly treated, and injected into 3 groups of chickens: receiving respectively 1,000, 5,000 and 10,000 phagocytes containing parasites. Chickens of the first two groups did not develop malaria, whereas in the third group 10 per cent. became infected. Controls injected with parasitized erythrocytes all became infected.

These experiments indicate that the malaria parasites which have been phagocytized are killed or inactivated. The author suggests that this effect may be due to release by the phagocyte of an enzyme. *C. A. Hoare*

EYLES, D. E. **Studies on *Plasmodium gallinaceum*. IV. A Comparison of the Susceptibility of *Aedes aegypti*, *Anopheles quadrimaculatus* and *Anopheles freeborni*.** *Amer. J. Hyg.* 1952, July, v. 56, No. 1, 71–7.

The susceptibility of mosquitoes to infection with malaria is dependent upon a number of factors some known and others unknown, and this investigation throws light on one interesting possibility, namely that a given population of mosquitoes may actually consist of two components, one susceptible and the other insusceptible to malaria. The standard test insect was *Aëdes aegypti*, and infections of *Plasmodium gallinaceum* were compared in *Anopheles quadrimaculatus* and the allied *A. freeborni*. Simultaneous feeding of paired lots of mosquitoes was done, and the mid gut was examined for oöcysts 5 to 9 days afterwards. Practically all *Aëdes aegypti* became infected, 59 per cent. of *Anopheles quadrimaculatus* and 15 per cent. *A. freeborni*. Oökinete formation and penetration of the gut wall almost always occurred, but in the less efficient vectors, many of the oöcysts failed to grow, or if they did, they became transformed into black spores and few sporozoites reached the salivary glands. The latter, however, proved infective to new chicks on 2 occasions.

The frequency distribution of oöcysts in *A. quadrimaculatus* showed much skewness and 25 per cent. of the population were completely refractory. It had previously been shown [this *Bulletin*, 1951, v. 48, 95] that it was possible to breed by selection an extremely susceptible race of this species. It is thought that these two races—one susceptible, the other refractory—should be compared separately with *Aëdes aegypti* and it is then found that the susceptible race of *A. quadrimaculatus* actually develops more oöcysts than does the *Aëdes*.

P. C. C. Garnham

GOODWIN, M. H., Jr. & STAPLETON, T. K. **The Course of Natural and Induced Infections of *Plasmodium floridense* Thompson and Huff in *Sceloporus undulatus undulatus* (Latreille).** *Amer. J. Trop. Med. & Hyg.* 1952, Sept., v. 1, No. 5, 773–83, 11 charts.

"The following observations resulted from studies of natural and induced infections of *Plasmodium floridense* infections in *Sceloporus undulatus undulatus*.

"1. No demonstrable increase in parasite density occurred if blood films were made daily. Frequent blood collections apparently depressed the peak of parasitemia.

"2. Massive inoculum caused early death of experimental animals and, in this study, inoculated animals died during or soon after the acute rise of parasites.

"3. No relapses were observed in naturally infected animals; decline and increase of parasite production was observed in a few instances.

"4. Long patent periods were characteristic of the infections."

POETSCHKE, G. Neue Ergebnisse der Malariaforschung. [**Current Results of Malaria Research**] *Ztschr. f. hyg. Zool.* 1952, Jan.–Feb., v. 40, Nos. 1/2, 1–32, 1 fig. [Numerous refs.]

A general review.

TRYPANOSOMIASIS

ROUBAUD, E. La *Glossina palpalis* des zones côtières à palétuviers de Douala (Cameroun français). [*Glossina palpalis* **in the Mangroves on the Coast of Douala, French Cameroons**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 3, 389–95, 2 figs.

In the mangroves on the coast of the French Cameroons, one finds an extremely dark form of *Glossina palpalis*, the pale markings on the abdomen unusually distinct. The insect is so dark that superficially it resembles *G. caliginea* with which it occurs. It is interesting that *G. palpalis* from mangroves in Senegal are not extremely dark, so that the colour is not directly attributable to environmental conditions. The genital characters of these dark specimens from the Cameroons are those of *G. p. palpalis*.

The author has tried to cross these dark flies with normally coloured *palpalis*. From four F_1 individuals, offspring of a single mother, he draws the conclusion that the dark character is recessive. For these and other reasons he concludes that his dark flies form a geographical race of *G. p. palpalis*. He proposes to call it "*palpalis palpalis rageaui*, nov. s. var".

On the basis of 41 dissections of the dark *palpalis*, it is concluded that this species is less frequently infected with pathogenic trypanosomes than *G. caliginea*. In only one example was an infection with *T. vivax* discovered (the rate in *caliginea* being 44 to 60 per cent.). *P. A. Buxton*

GIL COLLADO, J. La distribución de las especies del género "Glossina" en nuestras posesiones del Golfo de Guinea. [**The Geographical Distribution of Species of** *Glossina* **in Spanish Possessions in the Gulf of Guinea**] *Med. Colonial.* Madrid. 1952, Sept. 1, v. 20, No. 3, 185–91, 1 fig. & 2 maps.

The author gives details of the distribution of *Glossina palpalis* in Spanish Guinea and on the Island of Fernando Po. The species is common and widely distributed where conditions are suitable. There is an old record of *G. longipalpis* from Fernando Po ; recent observations and specimens are desired. *G. fusca* and *tabaniformis* have been identified from localities in Spanish Guinea. Two maps illustrate the text. *P. A. Buxton*

BAYLET, R. J. Note sur des suspects cliniques de trypanosomiase. [**Observations on Clinically Suspected Trypanosomiasis**] *Bull. Méd. de l'Afrique Occidentale Française.* 1952, v. 9, No. 1, 41–7.

This paper deals with the investigation of 22 West African patients suspected of suffering from trypanosomiasis (*T. gambiense*) in whom the diagnosis was not clear. The main symptoms were headache, mental disturbances, organic disturbances of the central nervous system, somnolence, adenitis and weakness.

The investigations included microscopical examination of thick blood films and gland juice and microscopical, chemical and serological examination of the cerebrospinal fluid. In 9 of the patients the cerebrospinal fluid was abnormal, and the findings were characteristic of syphilis in 2 and trypanosomiasis in 7.

In 13 the fluid was chemically and cytologically normal but in 1 of these serology revealed syphilis. Of the rest 7 had microfilariae in their blood, and treatment with notézine [hetrazan] was followed by improvement in 3 days and recovery after 2 courses of treatment each of 10 days with an intervening rest period of 10 days.

The author states that filariasis in his area commonly causes a clinical picture closely resembling that of trypanosomiasis so that the one must be remembered as a differential diagnosis of the other. The microfilariae found were not identified, and periodicity is not mentioned, nor is any information given about the prevailing filariasis of the country. *H. G. Calwell*

Neujean, G. & Evens, F. Valeur pratique de l'hémoculture comme moyen de diagnostic dans la trypanosomiase humaine à *T. gambiense*. [**Practical Value of Blood Culture in the Diagnosis of Human** *T. gambiense* **Infection**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 503–17.

Blood cultures were made by the method of Brutsaert and Henrard [this *Bulletin*, 1937, v. 34, 530 ; 1938, v. 35, 704] from 100 untreated and 62 relapsed treated sleeping sickness patients in the Belgian Congo in order to compare the diagnostic value of this method with that of combined gland puncture and thick blood film examination. Culture succeeded in 80 untreated and 27 treated cases while the other method showed trypanosomes in 92 untreated ; blood film examination without gland puncture was used for the treated cases and showed trypanosomes in 13. These results are analysed in several tables. It was found that one ingredient of the medium, *viz.*, blood of a healthy person, influenced the success of the method, some persons being more suitable than others, and even the blood of the same healthy person varied at different times in this respect for the culture of the trypanosomes of a single patient. Gland puncture and blood films are simpler to do than cultures and they gave better results in the untreated cases, but in the relapsed cases, diagnosed by lumbar puncture or by blood examination, the culture method was more successful than blood examination. *J. F. Corson*

Muraz. Diagnostic de la trypanosomiase humaine : de l'utilité, exceptionelle, et du danger de mort, exceptionnel, de la ponction sternale. [**Diagnosis of Human Trypanosomiasis : the Utility, and the Danger of Death, both Exceptional, of Sternal Puncture**] *Bull. Acad. Nat. Méd.* 1952, v. 136, Nos. 24, 25 & 26, 485–8.

In some cases of *gambiense* sleeping sickness where the usual methods of diagnosis have given negative results, microscopical examination of the bone-marrow, obtained by sternal puncture, has shown the presence of trypanosomes or of cells suggesting a trypanosome infection. Rarely the needle or trocar has been pushed right through the sternum into the right ventricle of the heart causing a tear, haemopericardium and rapid death. The author mentions such a case in a young African woman in French West Africa ; no post-mortem examination was made, but the clinical picture closely resembled that described by Olmer and Knebelmann (*Presse Méd.*, 1952, v. 60, 882). He considers that sternal puncture is only exceptionally needed for the diagnosis of sleeping sickness and that the needle should have a shield. [Olmer and Knebelmann described a case (no autopsy) and quoted other cases published by Fortner and Moss (*Ann. Intern. Med.*, 1951, v. 34, 809) ; in two cases the needle had

a guard. The latter authors show that the right ventricle is very close to the sternum and if this is abnormally thin or unusually resistant, it may be pushed back towards the pericardium with great danger to the heart if the needle has gone through the bone. They recommend that the iliac crest, vertebral transverse process, or great trochanter be used instead of the sternum in adults, while in children under five years the tibia is excellent for the operation. Sternal puncture has also been used, of course, in malaria and other conditions, see this *Bulletin*, 1950, v. 47, 590, 967 ; 1951, v. 48, 117, 239 ; 1952, v. 49, 229.]

J. F. Corson

PIERAERTS, G. Sur le fond d'oeil dans la trypanosomiase humaine. [**The Ocular Fundus in Human Trypanosomiasis**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 3, 357–80. [19 refs.]

The belief in the existence of specific ocular lesions in trypanosomiasis is widespread and even in recent articles there is hardly anyone who does not mention them although they are based on very meagre positive proofs. MORAX, the great French ophthalmologist, believed that ocular lesions did occur. True, he only examined the eyes of Europeans repatriated to France and he did not know of the co-existence of onchocerciasis and nutritional deficiencies. Such was his influence that few French ophthalmologists up to the present time stood up to contradict him. There are few doctors called upon to treat trypanosomiasis who have not seen cases of blindness associated with this disease. The fundi of the eyes in 224 cases of human trypanosomiasis were examined by Pieraerts before, and in the course of, treatment, the longest period of observation being 30 months. A large number of these cases showed signs of " torpid " choroiditis. Efforts were made to ascertain the relationship of the intensity of the choroiditis with the general prognosis in the different stages of the disease as well as the ocular prognosis. The choroiditis did not vary appreciably but varied a little according to the age of the patient and the part of the country from which he came.

Control examinations were also carried out in 625 persons living in the same villages and according to their ages. Identical changes were observed in the fundi as in those suffering from trypanosomiasis. Whether the choroiditis is specific or not, the author has not been able to find any relationship between it and the more or less grave optic atrophies which supervened later in the course of treatment, although it seemed that there was a relation between the optic atrophies and other concurrent lesions such as arsenic intoxication, circinate retinitis and deep choroiditis. His observations confirm those of RIDLEY [this *Bulletin*, 1946, v. 43, 534, 1018] and his conclusions are that the specific lesion of trypanosomiasis, even if it exists at all, is of little importance ; that it is extremely improbable that this lesion plays a part in the visual complications produced in the course of treatment ; that the visual complications are purely toxic in character ; that this toxic factor does not act in any particular way on the eyes of patients suffering from non-specific ocular lesions ; and that ocular lesions found can only be detected by preliminary ophthalmoscopy. These are uncommon and their presence is of little importance. In the present stage of our knowledge the dangerous arsenical treatment is only indicated in the third stage of the disease as alternative therapy can be given in the first and second stages.

The subject is discussed at length and detailed findings shown in 12 tables.

E. O'G. Kirwan

Claessens, H. Over een kalium emetiek resistente stam van *Trypanosoma gambiense* in de Kibombo-streek. [**Strain of *Trypanosoma gambiense* resistant to Tartar Emetic**] *Ann. Soc. Belge de Méd. Trop.* 1952, Apr. 30, v. 32, No. 2, 141–7. French summary (7 lines).

The author reports the finding in the Belgian Congo of a number of cases of sleeping sickness spontaneously resistant to treatment with tartar emetic. In these patients the trypanosomes persisted in the juice of the lymph glands after intravenous administration of 0·1 gm. of the drug. This strain retained its resistance to tartar emetic when transferred to guineapigs. Details of patients are given briefly in 4 tables. *C. A. Hoare*

Lourie, E. M. **The Evaluation of Chemotherapeutic Agents directed against Trypanosome Infections.** Reprinted from *Analyst.* 1952, Apr., v. 77, No. 913, 175–9. [27 refs.]

This paper under review presented at a meeting of the Biological Methods Group of Society of Public Analysts, gives a succinct and interesting account of the evaluation of chemotherapeutic agents. The author recognizes the value of statistical methods in biological standardization procedures which must however be used with appropriate experimental techniques. Because of the shift in favour of chemoprophylactic measures in combating African sleeping sickness in lieu of treatment, new and efficient methods are required in screening drugs. Those used by Ehrlich in his early work on trypanosomiasis while lacking the refinement of later methods, in all probability achieved as great a success as if the latter had been used, largely because the results obtained in laboratory animals cannot with certainty be correlated with those obtained in man, no matter what method of assay is used. Several illustrative examples of the fallacies inherent in laboratory tests are given, and are followed by a brief description of the factors involved in the biological assay of chemotherapeutic agents to ensure freedom from untoward results in man. *J. D. Fulton*

Abbott, P. H. **Observations on the Control of Sleeping Sickness among the Azande of the Southern Sudan.** *East African Med. J.* 1952, Aug., v. 29, No. 8, 297–309. [20 refs.]

Sleeping sickness was found in 1909 in the south-western part of the Sudan, on the borders of French Equatorial Africa and the Belgian Congo, and several reports on it have been published [see this *Bulletin*, 1931, v. 28, 343 ; 1945, v. 42, 969] ; the author gives a short history of this work.

In 1947 the Zande Development Scheme was started in this area with the object of raising the standard of living of the Zande tribe ; it included the growing, ginning, spinning and weaving of cotton, the manufacture of soap, and the preparation of oil, with increased transport facilities. Resettlement of the scattered inhabitants was necessary for adequate inspection by Agricultural Officers ; all this influenced the control of sleeping sickness because medical observation and treatment became easier to carry out and exposure of the population to tsetse flies was possibly reduced. From a consideration of the changed conditions produced by this scheme, the author thinks that control may be safely relaxed and suggests the measures of control which he now regards as desirable and sufficient. *J. F. Corson*

Hornby, H. E. **Animal Trypanosomiasis in Eastern Africa, 1949.** 40 pp., 7 figs. on pl. [Numerous refs.] 1952. London : Published for the Colonial Office by H.M. Stationery Office. [7s. 6d.]

The author, whose knowledge of animal trypanosomiasis in Eastern Africa is probably unrivalled, travelled for six months (June to November, 1949)

through Northern Rhodesia, Nyasaland, Tanganyika Territory, Kenya and Uganda, countries well known to him for many years, in order to investigate the present position of animal trypanosomiasis there. As tsetse flies convey trypanosomiasis to man as well as to his domestic animals and depend largely on wild game, the subject has many aspects—administrative, agricultural, veterinary, medical, forestry, game preservation &c.—and these aspects must necessarily form part of a comprehensive view and of recommendations for measures of control.

In the first half of the Report the author briefly describes the trypanosomes concerned and the diseases they produce, of which he gives some interesting examples. The second half is taken up with such matters as the distribution of domestic animals in relation to tsetse flies and to climate and vegetation, and with problems such as anti-tsetse measures, separation of the man-stock areas from the tsetse-game areas, climate and water-supply, overstocking, soil erosion, preservation and improvement of grazing areas, and control of other destructive diseases of domestic animals in these countries. In regard to the wild-game question, so much debated, the author would divide land into (1) " National Parks and Game Reserves " ; (2) " Settled areas so well-farmed that there is no room for tsetse flies " ; (3) " Wild Life Habitats in which settlement would be discouraged ", and shooting of game would be strictly controlled. Some recent advances in methods of controlling trypanosomiasis are referred to, and an Appendix contains notes on certain places suitable for pilot schemes of trypanosomiasis control.

The Report is an authoritative exposition of the whole subject of animal trypanosomiasis in Eastern Africa. *J. F. Corson*

CHANDLER, R. L. **Comparative Tolerance of West African N'dama Cattle to Trypanosomiasis.** *Ann. Trop. Med. & Parasit.* 1952, Sept., v. 46, No. 2, 127–34.

The small cattle of West Africa have long been known to be more resistant to trypanosomiasis than the zebu cattle ; the subject is well dealt with by STEWART (*Vet. Rec.*, 1951, v. 63, 454), referred to by the author. In the present paper the author describes an experiment made to compare the resistance of the small (N'dama) cattle, zebu cattle and N'dama-zebu hybrid cattle exposed to infected tsetse flies under natural conditions. At one place in N. Nigeria, Katabu, a herd consisting of 12 zebu cattle, 8 N'dama cattle and 12 N'dama-zebu hybrids, was exposed for 48 weeks to *Glossina palpalis* and *G. tachinoides* of which about 12 per cent. were infected, chiefly with *Trypanosoma vivax* and *T. congolense*. All the zebu cattle were infected and 9 died, all the hybrids were infected and 4 died, while only 4 of the N'dama cattle showed infection, which was light and transitory, and all survived. At another place, Lumu, *G. morsitans* was prevalent and all zebu cattle were known to die within 6 months of entering the area. Three of the N'dama-zebu hybrids and 5 of the N'dama cattle of the Katabu experiment, together with 3 more hybrids, were exposed for 28 weeks ; all the hybrids showed infection and 4 died of the disease, while none of the small cattle showed infection and all survived in good condition.

The author comments that though the influence of trypanosome infection in early life on the tolerance of these cattle cannot be overlooked, the tolerance shown was more likely to be natural than acquired. *J. F. Corson*

See also p. 10, LEVADITI, Possibilité de conserver *Tr. congolense* et *Pl. berghei* à —70°C. [**Preservation of *Trypanosoma congolense* and *Plasmodium berghei* at —70°C.**]

GALLIARD, H. Recherches sur le cycle évolutif de *Trypanosoma cruzi* Chagas. A propos de l'infestation péritonéale exclusive chez la souris. [**Life-Cycle of *Trypanosoma cruzi* in the Peritoneal Cavity of the Mouse**] *Ann. Parasit. Humaine et Comparée.* 1952, v. 27, Nos. 1, 2 & 3, 63–85, 11 figs. [38 refs.]

More than 20 years ago the author [this *Bulletin*, 1930, v. 27, 246, 841] described the behaviour of a strain of *Trypanosoma cruzi* which showed a predilection for the peritoneal cavity in experimental infections of mice. The appearance in recent years of a number of works expressing novel views on the life-cycle of this trypanosome induced the author to re-study the available material and to compare his findings with those of other workers in this field.

The strain of *T. cruzi* used was originally obtained from Uruguay in *Triatoma rubrovaria*. When passaged from mouse to mouse or from bug to mouse it gradually lost its virulence, but remained fully virulent in cultures. When inoculated into mice subcutaneously or intraperitoneally cultures of this strain produced an infection in the peritoneal cavity, with numerous trypanosomes in the exudate. Their multiplication takes place in the neighbourhood of the peritoneum—chiefly within the abdominal muscles and in elements of the reticulo-endothelial system. Trypanosomes were found in the subcutaneous oedemata and sometimes in the pericardium, but they were absent or very rare in the heart.

In mice inoculated subcutaneously with cultures, trypanosomes were recoverable in the peritoneal cavity from the 2nd day and in the blood only after the 8th day. Between the 14th and 23rd day the animals died, with enormous numbers of trypanosomes in the peritoneal cavity but none in the blood. The behaviour of other strains of *T. cruzi* in mice was normal, *i.e.*, leishmanial forms multiplied in the heart and trypanosomes occurred in the blood exclusively.

In a critical review of some previous investigations on the life-cycle of *T. cruzi*, the author points out that they were based on the interpretation of the diverse forms seen in smears of teased-up tissues which were arbitrarily linked up into successive stages of development. In contrast to these observations, he found that sections of infected tissues revealed in each " cyst " only parasites in the same stage of development. The study of these intracellular stages combined with that of the free flagellates provided better criteria for the interpretation of the true life-cycle of *T. cruzi* in its mammalian host.

The tissue " cysts " contained either leishmanial forms or slender trypanosomes, but sometimes also leptomonad and crithidial forms [the presence of the latter is evident from the description and figures]. The author never found in sections the rounded forms which, according to WOOD [this *Bulletin*, 1951, v. 48, 793] gave rise to trypanosomes by a process of unfolding. By comparing the appearance of the flagellates in fresh exudate and in stained preparations Galliard was able to demonstrate that these rounded forms were actually artifacts produced by stumpy trypanosomes after dry fixation and staining. The flagellates in the muscles were represented by leishmanial and slender trypanosome forms ; the reticulo-endothelial cells contained leishmanias with a small kinetoplast, while lying free in the exudate were the stumpy trypanosomes mentioned above.

From the study of all these forms the author believes that the life-cycle of *T. cruzi* in the vertebrate proceeds as follows. The slender blood trypanosomes (which he calls " *métacycliques* ") give rise to the stumpy trypanosomes ; these invade free reticulo-endothelial cells, where they become leishmanial forms, which are carried into the muscles, where they multiply and are eventually transformed into the definitive slender trypanosomes (" *métacycliques* "), either

directly or—in some cases—after passing through intermediate leptomonad or crithidial stages or both.

The author then discusses the nature of the polymorphism of the trypanosomes ("*métacycliques*"), which occur in the exudate (this strain) or in the blood (other strains) of the host. These trypanosomes may be represented by small slender forms and large broad forms, which some other observers regard as young and adult forms of *T. cruzi* respectively. However, it is pointed out that both forms can be found together throughout the entire infection. Moreover, the author was able to demonstrate that the alleged polymorphism is due to the technique used in preparing dry-fixed stained preparations, for trypanosomes from the same source are slender in thick smears, and broad [flattened] in thin smears.

The paper is provided with numerous figures illustrating various phases of the development of *T. cruzi* in the vertebrate host.

[It is unfortunate that the author repeatedly refers to the final blood forms of *T. cruzi* as "metacyclic trypanosomes". Since this term was originally created by Brumpt for the infective stage of trypanosomes in the insect-vector, and has since been employed in this restricted sense by the great majority of workers, its application to any other stage—especially in the vertebrate host—is misleading, and can only lead to confusion.] *C. A. Hoare*

GOBLE, F. C. **Observations on Experimental Chagas' Disease in Dogs.** *Amer. J. Trop. Med. & Hyg.* 1952, Mar., v. 1, No. 2, 189–204, 4 figs. [65 refs.]

This study of experimental Chagas's disease in dogs was undertaken in connexion with the evaluation of compounds found to be active against *Trypanosoma cruzi* in screening tests in mice.

For these experiments adult dogs and pups (10 weeks old) of both sexes were inoculated subcutaneously, intravenously or intraperitoneally, either with 100 million cultural flagellates of 2 strains (*A*, *B*) of *T. cruzi*, or with 500,000 blood trypanosomes of another (*W*) strain per kgm. bodyweight.

The prepatent (incubation) period varied with the strains used, as follows: 5–10 days (*W*), 9–13 days (*A*) and 10–42 days (*B*). The incubation period in animals infected by the subcutaneous route was somewhat shorter than in those infected intraperitoneally. The patent periods of the infection in adult dogs also varied according to the strain used: thus of 6 dogs infected with *W*, 3 died between the 21st and 28th days, and 3 recovered spontaneously; in the case of *B*, the infection lasted up to 40 days in adults, and up to 50 days in pups; in 2 adult dogs the infection persisted till the 95th day, when the animals were killed, but in the pups the infection was always fatal. The parasitaemia in the pups was always higher than in adult dogs, in which the maximum was 4 parasites per high-power field.

Among the symptoms, paraplegia was sometimes observed in untreated animals and in those treated with drugs, while death was due to acute, diffuse myocarditis and heart failure. Developmental (leishmanial) forms of *T. cruzi* were found in most of the organs of the infected animals examined, including the brain, which also showed distinct changes (glial nodules and agranulocytic infiltrations) in cases of paraplegia. Agglutination tests, carried out by HAUSCHKA's method [this *Bulletin*, 1950, v. 47, 607] did not produce consistent results.

A number of chemotherapeutic tests were carried out in pups infected with *B* strain. Bayer 7602 (Ac), administered intravenously in doses of 3·5 mgm. (base)/kgm. for 7 to 14 consecutive days, failed to affect the course of the disease, while isopentaquine was found to be non-curative in tolerated doses.

Promising results were obtained with pentaquine which was usually administered in daily doses of 10 mgm./kgm. *per os*, the total course varying from 90 to 410 mgm. This treatment produced cures, as shown by suppression of symptoms, elimination of parasites from the blood and absence of tissue forms (leishmanias) at autopsy. However, this treatment was always associated with signs of 8-aminoquinoline toxicity, including paralysis of nictitating membrane, salivation, anorexia, impairment of pupillary reflexes, cyanosis and cachexia, in the succession indicated. It is noticed that while in animals isopentaquine is more toxic than pentaquine, in man the toxicity of these compounds is reversed, therefore it is possible that either of them might prove to be of value in human Chagas's disease. *C. A. Hoare*

LEISHMANIASIS

Reid, H. A. **Kala-Azar in South Persia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Sept., v. 46, No. 5, 555–7, 1 map. [16 refs.]

This paper describes a case of kala azar, with characteristic features and confirmed by splenic puncture and aldehyde test, in a Persian boy aged 4 in Abadan. At the age of 2 and again at 3 years he had spent a few months at Kazerun (between Shiraz and Bushire) and it was after the second visit that the initial fever began. No proved case of kala azar has been recorded from Abadan (though there was a suspected one there in 1950) so the present patient presumably acquired the infection in Kazerun.

A map shows the distribution of reported cases in S.W. Asia. While cutaneous leishmaniasis is common there in man and dogs, the visceral form is rare, except in Transcaucasia. Where diagnostic facilities are available, as in Baghdad and Abadan, frequent quests for it have been made and were all negative.

The boy in this case responded excellently to sodium stibogluconate.

Although the sandflies of northern and mid-Persia have been surveyed, there is no information about them in South Persia, nor of the incidence of visceral leishmaniasis in dogs. A survey on these points would be valuable. The present is believed to be the first indigenous case recorded in South Persia.

H. J. O'D. Burke-Gaffney

Benetazzo, B. & Cicchini, T. Leishmaniosi. Fenomeni immunitari (Studio critico-sintetico). [**Immunological Aspects of Leishmaniasis**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, Apr., v. 33, No. 4, 187–229. [Numerous refs.]

The English summary appended to the paper is as follows :—

" This paper gives us a review of the literature and a summary of the studies carried out by many authors on immunity to leishmaniasis. The identity of the different species of the genus *Leishmania* is still to be established, though the distinction in *L. donovani*, *L. tropica* and *L. brasiliensis* is of common use.

" A natural immunity seems to exist in endemic areas and there are reports of acquired immunity, but the researches on agglutinant, precipitant, complement deviating and haemolytic bodies have not yet given satisfactory results. The problem is still open to investigation.

" Attempts to achieve lasting immunity in man by means of vaccination were made and considerable results were obtained in cases of cutaneous lesions.

" Further research, together with the use of insecticides (DDT and others) may lead to an effective control of the disease."

CORRADETTI, A. **The Epidemiology and Control of Oriental Sore in Abruzzo, Italy.** *Amer. J. Trop. Med. & Hyg.* 1952, July, v. 1, No. 4, 618–22, 2 figs.

In Abruzzo, Italy, the entire populations of towns and villages were examined for cutaneous leishmaniasis ; of 28,599 persons examined 2·9 per cent. had active lesions and 20·8 per cent. showed scars. The prevalent species of phlebotomus were *Phlebotomus papatasi*, *P. perniciosus* and *P. perfiliewi* ; being the most abundant, the last is believed to be vector. Residual DDT applied to houses and stables throughout the area at a dosage of 2 gm. per sq. met. and in the form of an emulsion reduced the incidence of oriental sore from 29 per 1,000 to 1·3 per 1,000 between 1948 and 1950. DDT was applied on two occasions only, the summer months of 1948 and 1949. In adjacent untreated areas the incidence of active lesions in 1948 and 1950 was 34·9 and 40·4 per 1,000. No definite catching stations for sandfly were established but continual personal searches by the author indicated a complete disappearance in houses and stables in the treated areas and persistence in great numbers in the untreated areas.

R. Ford Tredre

FEVERS OF THE TYPHUS GROUP

MONTOYA, J. A. Observaciones sobre tifo epidemico en curies domesticos. [**Note on Epidemic Typhus among Domestic Guineapigs**] *Bol. Oficina Sanitaria Panamericana.* 1952, Aug., v. 33, No. 2, 136–8. [15 refs.]

Among 172 guineapigs kept in the kitchens and under the beds of the people of Nariño, 8 gave positive complement-fixation reactions at titres of 1–8 to 1–64 with antigens of epidemic typhus and at lower titres in each case with murine typhus antigens.

Nariño is in the southern part of Colombia and a considerable part of the population live in cool localities at an altitude of about 2,000 metres. Louse-borne typhus has occurred periodically in epidemic form in the region for many years, and in one of the two places in which positive reactions occurred among the guineapigs an outbreak had occurred in 1946. Work on the isolation of strains of rickettsiae and a study of the epidemiological significance of the findings is in progress.

John W. D. Megaw

WEYER, F. Künstliche Übertragung von *Rickettsia rickettsi* (Rocky Mountain Spotted Fever) auf Insekten, insbesondere auf Kleiderläuse. [**The Artificial Transmission of *Rickettsia rickettsi* (of Rocky Mountain Spotted Fever) through Insects, especially Human Lice**] *Ztschr. f. Hyg. u. Infektionskr.* 1952, Sept. 15, v. 135, Nos. 3/4, 280–97, 10 figs. [10 refs.]

The object of the experiments described was to find whether *Rickettsia rickettsi* could survive and multiply in true insects, especially lice, as they are known to do in ticks. A highly virulent strain of the organism was employed ; the arthropods tested were ; the louse, *Pediculus humanus humanus* ; the tick, *Ornithodorus moubata* ; the rat flea, *Nosopsyllus fasciatus* ; the bed bug, *Cimex lectularius* ; and the larva of the meal beetle, *Tenebrio molitor.* Intra-rectal and intracoelomic inoculations were made with suspensions of infected ticks, insects or mouse lungs.

In bed bugs and fleas the rickettsiae survived for 1–3 weeks. In the coelom of the meal beetle larvae there was pronounced multiplication of the organisms and even after small doses of infective material virulent rickettsiae could be isolated, in some cases up to 34 days after inoculation. In lice also there was great multiplication after intracoelomic inoculation and repeated passages were made. Lice inoculated by the rectum died in 4–6 days but rickettsiae could not be recovered after the 3rd passage at latest. In the passages which were successful by this method the rickettsiae multiplied in the epithelial cells of the intestine ; these were shed in large numbers into the lumen of the organ, causing complete obstruction. With intracoelomic inoculation the rickettsiae were found free in the fluid or in the blood cells. An interesting finding was that the rickettsiae were never seen inside the nuclei of the invaded cells of any infected arthropod.

The results of intrarectal inoculation of lice differed greatly from those observed by WEIGL, who in 1931 described abundant extracellular multiplication of the rickettsiae in the lumen of the intestine, which remained healthy so that the organisms behaved in much the same way as *R. quintana*. Weigl also made 10 successive passages of *R. rickettsi* through the lice over a period of 5 months and found no loss of virulence or pathogenicity of the organisms for guineapigs ; his experiments were carried out in similar conditions except that he used a different strain and the lice were nourished by rectal injections of human blood instead of being fed on human volunteers or rabbits, as was done by the author.

The author concludes that there are pronounced differences between the " insect rickettsiae ", *R. prowazeki* and *R. mooseri*, on the one hand and the " tick rickettsiae ", *R. rickettsi* and *R. conori* on the other hand ; he found the latter two to behave in exactly the same way when inoculated intrarectally into lice. The conclusion reached was that the louse is not a favourable host for the tick rickettsiae.

The technical methods adopted are fully described and the article is illustrated with 10 excellent photomicrographs. [Those interested in the study of rickettsiae by intrarectal and intracoelomic inoculation of arthropods will find references to the previous articles on the subject by the author in this *Bulletin*, 1949, v. 46, 623, 624, 627, 818 ; 1950, v. 47, 1074 ; 1951, v. 48, 352 ; 1952, v. 49, 255, 762.]

The striking differences in the findings of these two authorities on rickettsiae suggest the need for caution in the interpretation of the results of artificial experiments such as the intrarectal inoculation of lice with rickettsiae.

John W. D. Megaw

AQUILINA, J. T., ROSENBERG, F. & WUERTZ, R. L. **Nodal Tachycardia in a Case of Rocky Mountain Spotted Fever.** *Amer. Heart J.* 1952, May, v. 43, No. 5, 755–60.

BABUDIERI, B. & RAVAIOLI, L. Infezione sperimentale della pecora con *Coxiella burneti*. [**Experimental Infection of Sheep with** *Coxiella burneti*] *Rendiconti Istituto Superiore di Sanità*. Rome. 1952, v. 15, Pt. 3, 195–214, 8 figs. [Refs. in footnotes.]

The English summary appended to the paper is as follows :—

" The authors infected three sheep with *Coxiella burneti* by means of subcutaneous and intratracheal methods. The animals displayed only slight symptoms of the disease. An examination of blood, milk, urine, and excrements for the pathogenic agent, protracted for about 5 months, yielded positive

results only for blood, milk and urine, and only for a short time after the infection.

"After 8 months the three animals were killed and their organs, as well as those of other five sheep coming from an infected area, were examined for *C. burneti*. The examination gave negative results.

"In the animals experimentally infected, the complement binding reaction became positive in 7 days and then diminished slowly in intensity and became negative after about 200 days. Agglutination and intra eyelid reaction remained, instead, positive for a longer period. This latter provoked a sudden and fugacious reappearance of antibodies in the blood."

BABUDIERI, B. & MOSCOVICI, C. Infezione sperimentale e naturale da *Coxiella burneti* negli uccelli. [**Experimental and Natural** *Coxiella burneti* **Infection in Birds**] *Rendiconti Istituto Superiore di Sanità.* Rome. 1952, v. 15, Pt. 3, 215–19.

The English summary appended to the paper is as follows :—

"The authors succeeded to infect intraperitoneally geese, ducks and pigeons with *Coxiella burneti*. Pigeons can be infected orally as well. The birds only remain seropositive for a short period of time. In the kidney of duck and pigeon the rickettsia persists for at least 6 weeks. In a locality, where Q-fever cases appeared in men, a seropositive goose and several such pigeons were found. A pigeon examined in the place and at the time of an epidemic proved to be a carrier of rickettsia. These findings suggest, that domestic birds could play a rôle, in particular circumstances, in the transmission of Q-fever."

YELLOW FEVER

RAYNAL, J. H. Epidémiologie de la fièvre jaune en Afrique. Nos connaissances actuelles sur son cycle selvatique. [**Epidemiology of Yellow Fever in Africa. Present Knowledge Regarding the Cycle of Jungle Yellow Fever**] *Méd. Trop.* Marseilles. 1952, July–Aug., v. 12, No. 4, 385–414. [171 refs.]

A general review.

SMITH, Ashbel [M.D., A.M.]. **Yellow Fever in Galveston, Republic of Texas, 1839.** pp. xvii+135, frontispiece & 2 pls. 1951. Austin : University of Texas Press. [20*s.*]

ELTON, N. W. **Sylvan Yellow Fever in Central America.** *Pub. Health Rep.* Wash. 1952, May, v. 67, No. 5, 426–32, 4 figs. & 1 map. [16 refs.]

DICK, G. W. A. & GEE, F. L. **Immunity to Yellow Fever Nine Years after Vaccination with 17D Vaccine.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, July, v. 46, No. 4, 449–58, 1 map. [12 refs.]

In November 1950, a yellow fever immunity survey was made at four places in Western Uganda. Three of the places were within, and one outside, the area of a mass vaccination with 17D vaccine in 1941 [see this *Bulletin*, 1949, v. 46, 542].

The survey was made on the sera of 202 persons of whom 171 appear to have been children. Consideration of the children under 9 years of age leads to the conclusion that no epidemic of yellow fever had occurred in these localities since the vaccination campaign.

In the discussion the authors analyse in some detail the effects of the ages, presumed and known, of the subjects of the investigation, and of factors such as migration which might have affected the survey.

They conclude that 77·2 per cent. of those vaccinated 9 years earlier remained immune ; whereas in the area in which vaccinations were not practised in 1941, the percentage of immunes was 17·5.

It is suggested that the validity of yellow fever certificates could be extended up to at least 9 years after vaccination, except in the case of children who were under 7 when vaccinated. *E. T. C. Spooner*

See also p. 9, Floch, Lutte antipaludique et Lutte Antiamarile en Guyane Française. Déroulement de la troisième campagne de pulvérisations d'insecticides à effet rémanent dans les habitations. [**Control of Malaria and Yellow Fever in French Guiana. Third Stage of the Campaign with Residual Insecticides**]

DENGUE AND ALLIED FEVERS

Reagan, R. L. & Brueckner, A. L. **Studies of Dengue Fever Virus by Electron Microscopy.** *J. Bacteriology.* 1952, Aug., v. 64, No. 2, 233–5, 1 fig.

"Studies by electron microscopy of brain suspensions of mice infected with dengue fever virus (mouse adapted Hawaii strain) show the virus to be rodlike in shape, from 42 to 46 mμ in width, and 175 to 220 mμ in length. These rod shaped bodies could not be demonstrated in concentrated normal mouse brain subjected to the same procedure of concentration and electron microscope examination. The virus in the concentrated infected material was confirmed to be dengue fever virus by neutralization tests done in Swiss albino mice."

Hotta, S. & Shiomi, T. **Blood Picture of the Experimental Dengue Infections in Man and in Mouse.** *Acta Scholae Med. Univ. in Kioto.* 1952, v. 30, No. 1, 11–17. [16 refs.]

"Leucocytic counts, with especial reference to the differential ones, as well as calculation of the average nuclear number of neutrophils, were conducted with human volunteers and white mice both infected with the mouse-transmitted dengue virus.

"The changes observed were identical or very similar in the human beings and mice, suggesting a possibility of using the experimental murine dengue as a model test of human dengue.

"The leucocytic reactions of the infected mice varied in quantity, but not in quality, as different virus-strains were inoculated.

"Shift of the average nuclear numbers of neutrophils was deemed to indicate viral virulence."

PLAGUE

Devignat, R. Particularités de la peste au Congo Belge. [**Special Features of Plague in the Belgian Congo**] *Rev. Coloniale de Méd. et Chir.* 1952, Aug. 15 & Sept., v. 24, No. 205, 148–56. [21 refs.]

The author has recently written a very interesting paper in which he speculated on the origin of the three main varieties of *Pasteurella pestis* [see this

Bulletin, 1952, v. 49, 45]. He now discusses the epidemiological peculiarities of plague in the Belgian Congo in a paper which can be regarded as a continuation of his two previous articles on the same subject [*ibid.*, 1946, v. 43, 647, 1,137].

Plague in Ituri, which is one of the two chief foci of infection in the Belgian Congo, is said to be caused by the variety of the bacillus called *P. pestis antiqua* and described in the author's recent paper as a very virulent strain which is probably the descendant of the organisms responsible for the epidemics mentioned in the Bible and the Iliad of Homer.

The modes of transmission of infection are described as: (1) interhuman (man to man); (2) interdomestic (domestic rat to domestic rat); (3) intersylvatic (wild rat to wild rat); (4) domestico-human (domestic rat to man and *vice versa*; (5) domestico-sylvatic (domestic rat to wild rat and *vice versa*); (6) sylvo-human (wild rat to man and *vice-versa*).

Details are given of the various rodent reservoirs and vectors known or believed to be concerned. Justice cannot be done in a brief summary to this paper which contains descriptions of personal observations, critical references to the literature and a number of imaginative speculations on the epidemiology of plague in general. The most important practical point that emerges is that despite the great virulence of the Ituri strain the live attenuated vaccine E.V. introduced by Girard and Robic in 1934 [this *Bulletin*, 1934, v. 31, 885] is completely effective in prophylaxis. *John W. D. Megaw*

Baltazard, M. & Aslani, P. Caractères biochimiques des souches de peste "sauvage" du Kurdistan. [**Biochemical Characteristics of Strains of "Wild" Plague in Kurdistan**] *Ann. Inst. Pasteur.* 1952, Aug., v. 83, No. 2, 241–7.

In the investigation described 73 strains of *Pasteurella pestis* were studied; they were isolated in the course of the epidemiological survey carried out in Kurdistan by Baltazard *et al.* over a period of 4 years [see this *Bulletin*, 1952, v. 49, 1041].

Four of the strains were isolated from patients, 3 were from fleas found on rodents, 61 were from three species of *Meriones* and 3 were from jerboas: the remaining 2 were from other rodents. All the strains showed identical features: fermentation of glycerin, no fermentation of rhamnose, no production of nitrous acid, and no reduction of nitrates to nitrites. Strains showing these characteristics have hitherto been described only from Soviet Russia, north of the Caspian Sea, where also *Meriones* appears to be the essential animal reservoir of infection. The authors regard it as an open question whether the occurrence of similar strains in the different areas is due to a common ancestry of the organisms or to the special resistance of *Meriones* to the organism; they suggest a special investigation of strains from other regions in which *Meriones* forms the chief reservoir of infection. *John W. D. Megaw*

CHOLERA

Narayanan, E. K. & Menon, P. S. **Enzymes of *Vibrio cholerae*.** [Correspondence.] *Nature.* 1952, Oct. 11, v. 170, 621.

By methods which are described, the authors, in Kasauli, have demonstrated a collagenase with an optimum *p*H of 8·0 in culture filtrates of *V. cholerae* (but not in those of *Bact. coli*). A table shows the *p*H, nitrogen /ml., and increase

in nitrogen /ml. of fresh filtrate incubates over controls : this increase in the dissolved nitrogen, with a maximum of *p*H 8·0, shows the presence of a collagenase. The enzyme can act over a wide range, and there is evidence that collagenase is present to some extent in filtrates of vibrios other than *V. cholerae*. The work progresses and publication of details is promised.

H. J. O'D. Burke-Gaffney

Chimienti, Nicola. Persistenza ultraquarantennale della reazione nitrosindolica in feci coleriche. [**Persistence of the Nitroso-Indol Test in Cholera Stools for 40 Years**] *Giorn. di Batteriol. e Immunol.* 1952, July–Aug., v. 44, Nos. 9/10, 335–6. English summary (2 lines).

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

Spingarn, C. L. & Edelman, M. H. **Further Observations on the Use of Streptomycin and Penicillin in the Cultivation of *Endamoeba histolytica* from Stools.** *Amer. J. Trop. Med. & Hyg.* 1952, May, v. 1, No. 3, 412–16. [12 refs.]

The authors compare the effects of streptomycin and penicillin on the growth in culture of *Entamoeba histolytica* recovered in the form of cysts from human stools. The amoebae were cultivated in semi-solid medium to which were added either 3–6 mgm. streptomycin sulphate or 3,000–6,000 units of crystalline sodium penicillin, together with rice starch. Both antibiotics increased the number of positive cultures of *E. histolytica*, their favourable effect being due to inhibition of the mixed bacterial flora, thereby both reducing the total bacterial population and altering it qualitatively. [For previous work by the authors, see this *Bulletin*, 1949, v. 46, 465]. *C. A. Hoare*

Luttermoser, G. W. & Phillips, B. P. **Some Effects of Cultural Associates on the Infectivity of a Strain of *Endamoeba histolytica* for the Rabbit.** *Amer. J. Trop. Med. & Hyg.* 1952, Sept., v. 1, No. 5, 731–5. [12 refs.]

"1. Trophozoites from various cultures of strain 200 *Endamoeba histolytica* were evaluated as to their infectivity for rabbits.

"2. When cultivated with a mixed bacterial flora, strain 200 produced a fatal ulcerative amebiasis in about 85 per cent of the inoculated animals as compared to 35 per cent when cultivated with a single bacterial associate, organism *t*.

"3. Trophozoites from bacteria-free cultures, with *T. cruzi* as an associate, produced but one infection when inoculated into 24 animals.

"4. The infectivity of trophozoites of *E. histolytica* grown with *T. cruzi* was restored after the amebae were re-established in LER culture with bacteria.

"5. *In vitro* observations demonstrated that amebae grown in the absence of bacteria (amebae-*T. cruzi* cultures) became readapted to an environment with bacteria only with difficulty. Hence, this is offered as a possible explanation for the low infectivity of these amebae when inoculated intracecally into rabbits, although the possible influence of encystation on infectivity must be considered."

Shaw, H. M. & Hughes, E. S. **A Case of Amoebiasis with Extensive Ulceration of the Skin.** *Australian & New Zealand J. Surgery.* 1952, May, v. 21, No. 4, 312–14.

TRIPODI, P. & MAGNANELLI, P. Amebiasi intestinale cronica e ulcera gastro-duodenale. [**Chronic Intestinal Amoebiasis and Peptic Ulcer**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, Apr., v. 33, No. 4, 179–86. [28 refs.]

The English summary appended to the paper is as follows :—

" The authors examined 1144 patients suffering from chronic amebiasis and found among them 41 cases of peptic gastroduodenal ulcer. They discuss the pathogenesis of these cases, considering also the literature on the subject."

KNIGHT, A. A. & TARUN, D. W. **A Search for Liver Damage in Anti-Amebic Treatment with Diodoquin, Vioform and Carbarsone.** *Amer. J. Trop. Med. & Hyg.* 1952, Sept., v. 1, No. 5, 727–30.

" Fifteen patients with laboratory proven intestinal amebiasis were treated with diiodohydroxyquinoline (Diodoquin), carbarsone, and iodochlorhydroxy-quinoline (Vioform) over a period of six weeks. Four different liver function tests were performed on each subject prior to treatment and following the completion of each drug. There was no apparent damage detectable due to therapy. No studies of liver function were done with antibiotics in the treatment of amebiasis. The authors believe that carbarsone and the hydroxy-quinoline drugs still remain the treatment of choice in amebiasis because of the disturbance of the normal intestinal flora of the colon with some of the newer antibiotics."

SMITSKAMP, H. Diagnose en behandeling van het amoeben-absces van de lever. [**Diagnosis and Treatment of Amoebic Liver Abscess**] *Nederl. Tijdschr. v. Geneesk.* 1952, Oct. 4, v. 96 (iv), No. 40, 2467–72. [12 refs.]

The English summary appended to the paper is as follows :—

" The author reports on eighteen cases of amoebic liver abscess and discusses the diagnosis, differential diagnosis and treatment. In the majority of cases the patients were admitted on a faulty diagnosis. When the diagnosis is made early, medical treatment will suffice."

SUBRAMANIAM, R. **Resochin in the Treatment of Amoebiasis of the Liver.** *Indian Med. Gaz.* 1952, July, v. 87, No. 7, 295–300.

Resochin (Bayer) is the trade name for chloroquine.

Amoebic hepatitis and amoebic abscess of the liver are of common occurrence in Madras. Thirty-two patients were admitted, and of these, 18 were suffering from hepatitis and 14 from liver abscess. Apart from these there were 19 in whom the presenting condition was pulmonary with only minimal involvement of the liver. The beneficial effects of the drug were felt in 24 hours and no toxic manifestations were evident. An opportunity presented itself to study the treatment of liver abscess on the older lines and to compare the results with the new. On the whole the response in cases of lung involvement was more dramatic than in the liver condition. While with the older methods months sometimes elapsed before completion of cure, with resochin this took place in a week.

The dosage recommended and followed was for the first four days one tablet of 0·25 gm. every six hours, from the 5th to 12th day one tablet twice daily and from the 13th to the 21st day once daily. It is important that the drug should be given after food, never on an empty stomach.

Resochin was available for only 12 of the patients in this series. Full clinical details are given in a table. In all, " the result has been very satisfactory ".

Particular mention is made of relief from pain, within 24 hours, and the restoration almost immediately of the diaphragmatic movement, which with emetine does not take place till long after the emetine treatment has been completed.

This drug therefore represents a definite advance in the treatment of hepatic and pulmonary amoebiasis. *Philip Manson-Bahr*

MILLER, M. J. **The Experimental Infection of *Macaca mulatta* with Human Strains of *Entamoeba histolytica*.** *Amer. J. Trop. Med. & Hyg.* 1952, May, v. 1, No. 3, 417–28, 4 figs. on pl. [13 refs.]

While a number of different animals can be experimentally infected with *Entamoeba histolytica*, with the production of typical lesions and symptoms of amoebiasis, the majority of them cannot be regarded as normal hosts of this parasite. An exception is provided by some monkeys naturally infected with *E. histolytica*, which undergoes its complete life-cycle in these hosts. Having undertaken a study of the host-parasite relations in non-dysenteric intestinal amoebiasis of man, the author has used macaque monkeys as experimental animals, since—apart from man—they are the only other natural hosts of *E. histolytica*.

The 4 young monkeys (*Macaca mulatta*) used in these experiments were obtained in Calcutta. They were all naturally infected with *E. histolytica*, which were eradicated by treatment with diodoquin, after which the monkeys were inoculated (by stomach tube or *per rectum*) with suspensions of amoebae from 3 human patients : one a symptomless carrier, and two suffering from dysentery. The animals were subsequently killed and their bowels were thoroughly examined for the presence of amoebae and lesions. All the animals became infected but in no case was there any evidence of invasion of the gut wall, the amoebae being restricted to the lumen, in which they were evidently living and multiplying as commensals.

The results obtained in these experiments agree with observations previously reported by KESSEL [this *Bulletin*, 1929, v. 26, 229], DOBELL [*ibid.*, 1931, v. 28, 705] and HEGNER [*ibid.*, 1935, v. 32, 781] on entamoebic infections of macaque monkeys, but are in contrast with the findings of HEGNER *et al.* [*ibid.*, 1932, v. 29, 584], in experimental infections of American monkeys, in which *E. histolytica* invaded the tissues, with the production of typical lesions and symptoms. It is thus evident that there is a marked difference in the behaviour of *E. histolytica* in different groups of monkeys : while it is pathogenic to new world monkeys, it is relatively harmless to old world ones. It is pointed out that among human beings there is a high incidence of infection, but a low dysentery rate, and " a comparison of the clinical manifestations of amebiasis in these three groups would indicate that the course of infection in the old world monkeys more nearly resembles that seen in humans than does the course of infection in new world monkeys ". The paper is illustrated by 4 photomicrographs. *C. A. Hoare*

LEAL, R. A. & AMARAL, A. D. F. Novos estudos sôbre amebas encontradas em esgôto, com referência especial a uma endameba (*E. moshkovskii*) semelhante à *Endamoeba histolytica*. [**New Studies on Amebae found in Sewage with special reference to an *Endamoeba* (*E. moshkovskii*) which is Similar to *E. histolytica***] *Arquivos Facul. de Hig. e Saude Pública Univ. de São Paulo.* 1950, Dec., v. 4, No. 2, 125–33, 8 figs. on pl. [11 refs.] English summary.

This is a further contribution to the study of *Entamoeba moshkovskii*, a free-living amoeba morphologically indistinguishable from *E. histolytica*

which the authors had previously isolated from sewage in São Paulo. They now report the finding of the same organism and of a *Hartmannella*-like amoeba in two other sewage works of that city. Both amoebae could be cultivated at temperatures from 6° to 42°C., but optimum growth was obtained between 15° and 37°C. Observations were made on the viability of the amoebae under different conditions. They were isolated together from digested sludge with 78·5 and 41·0 per cent. humidity, but when the humidity was lowered to 9 per cent. only *Hartmannella* survived. This amoeba was also found in sludge which had been kept in the laboratory for 4 years and had only 7·3 per cent. humidity. However, when grown together with the *Entamoeba*, *Hartmannella* disappeared from the cultures after 7 months. It was also shown that relative anaerobiosis in the culture medium was unfavourable to the multiplication of both organisms.

Attempts were made to infect guineapigs with *E. moshkovskii* by intracaecal inoculation of cultures, but amoebae were found only in the intestinal contents of those animals which were killed up to 48 hours after inoculation, while a histopathological examination of the caeca revealed no lesions.

It is conceivable that cysts of *E. moshkovskii* might be accidentally swallowed by man and then discharged in his stools. Since they are indistinguishable from cysts of *E. histolytica*, their finding might lead to errors of diagnosis. This possibility was put to the test by cultivating at room temperature cysts [presumably quadrinucleate] from the stools of 16 human carriers. However, in no case was any development of an *Entamoeba* observed, but in two instances *Hartmannella* appeared in cultures.

In view of the frequent occurrence of *E. moshkovskii* in nature, workers are warned against errors of diagnosis of *E. histolytica* in stools that have been exposed to the risk of contamination by the free-living species. In cases of doubt, the identity of the cysts can only be determined by biological methods : if they grow at low temperatures they belong to *E. moshkovskii*, if not—they might be *E. histolytica*. *C. A. Hoare*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

ANNECKE, S. **Relapsing Fever.** [Correspondence.] *South African Med. J.* 1952, Aug. 30, v. 26, No. 35, 720.

The author adds to the findings which he recently recorded with QUIN [this *Bulletin*, 1952, v. 49, 869].

All huts treated with 600 mgm. gamma-isomer/sq. ft. BHC have remained free from *O. moubata* after 27 months : in the case of 300 mgm./sq. ft. the huts are free after 12 months.

For malaria control, 25–30 mgm. gamma/sq. ft. BHC wettable powder is used twice each season at 3-month intervals : while the small quantities thus used have little effect on *O. moubata*, it is suggested that the cumulative effect of and continuous contact with BHC may eventually reduce and, in time, even destroy the tick. Experiments along these lines are therefore being made in malarious areas. *H. J. O'D. Burke-Gaffney*

HEISCH, R. B. **On Spirochaetes observed in the Blood of a Bat (*Megaderma cor* Peters) from a Kenya Coastal Cave.** *East African Med. J.* 1952, Aug., v. 29, No. 8, 327, 1 fig. on pl.

The author reports the finding of spirochaetes morphologically identical with those of relapsing fever in the blood of an insectivorous bat, *Megaderma*

cor, in a cave some 20 miles south of Mombasa. The blood infection, which was heavy, is illustrated in a photomicrograph. The spirochaete was not seen in over 100 other bats examined.

This appears to be the first record of a natural spirochaetal infection in East African bats. It is proposed to name the organism *Spirochaeta megadermae*, n. sp.

H. J. O'D. Burke-Gaffney

YAWS

HASSELMANN, C. M. **Experimental Evidence and Clinical Studies as Basis for Nomenclature in Frambesia Tropica (Yaws).** *Arch. Dermat. & Syph.* 1952, July, v. 66, No. 1, 107–22, 10 figs. [Refs. in footnotes.]

The author stresses that " succinct clarity in nosological nomenclature and standardization of definitions are imperative in all phases of vital statistics and clinical description. Without them, no intelligent comparison of morphological and epidemiological data is judiciously possible." " Ignorance of established facts in experimental treponematoses, yaws as well as syphilis, is the bane of many writers on merely clinical cases." " To flirt with nomenclature customary in syphilology would mean lack of verisimilitude. In frambesiology, it would mean a dead end. Emancipation from such misleading terminology is vital to stop the ever-mounting confusion and misinterpretation." In Manila " the definite ' epidermotropism ' of Treponema pertenue was experimentally established, and the distinct immunological phenomena which both govern and determine the relevant morphological lesions in all stages of yaws were noted. . . . Neither in man nor in animal have frambesial ulcerative lesions ever been observed to commence as such, but invariably start from a preexisting yaws lesion either the initial one or a metastatic yaw." The author thinks that these late ulcerative lesions as well as the late palmar and plantar lesions are probably allergic in origin.

In the summary he writes, " the striking overlapping of successive stages of frambesial skin efflorescences and their corresponding histopathological features are in singular contrast to the clear-cut divisions into primary, secondary, and tertiary syphilis and to the latter's morphological and pathological diversity. . . . It would be fatuously unreasonable and illogical to refer in frambesia to ' primary,' ' secondary,' or ' tertiary ' lesions and stages as in syphilis, inasmuch as the initial ' primary ' yaw may persist throughout the entire stage of subsequent generalized metastatic polypapillomata, corresponding to the secondary syphilids, and may suddenly exacerbate into an ulceration at any late stage of the disease, even with polypapillomata coexistent.

" In frambesiology, as in all realms of medicine, inerrancy of human and animal experimental investigations must be accepted. Hence it appears sensible and sufficiently descriptive to refer to the lesions as (*a*) initial yaw, whether papular or already papillomatous ; (*b*) generalized, metastatic papules and mostly papillomata (polypapillomatous stage) ; (*c*) the late stage, with (1) keratodermia of soles and/or palms and (2) ulcerative lesions, wherever these are located and irrespective of their indeterminable pathogenesis, except in experimental frambesia.

" If further dermatomorphological descriptions of skin efflorescences are considered appropriate for differentiation in a particular patient, such subdivisions and relevant dermatological terms could be used as keratosis-pilaris-like frambesids (*pian d'atre*), which often are coexistent with generalized metastatic polypapillomata ; gangosa for the distinct ulcerations of the nose

and mouth orifices involving the palate, and ringworm yaws and frambesiderma psoriasiforme to denote the circinate configuration or scaliness, respectively, of any one particular yaws efflorescence. . . .

"Only the simplest and broadest classification, based on commonly acceptable and logical nomenclature, with uncomplicated reporting, will insure accurate future assessment of the results in the mass campaigns conducted at present . . . where often but a few persons adequately trained in dermatology carry the burden of field work."

[In the reviewer's opinion the author is submerging yaws in deeper conflict and confusion than ever. The reviewer finds it difficult to recognize the yaws he has been interested in as the same disease about which the author is writing. That is only a personal opinion. There may be field workers who will find inspiration in the paper in its original form.] *C. J. Hackett*

ENY, Desire M. & QUALLS, D. M. **Quantitative Study of the Amino Acids of the Blood Plasma of African Patients afflicted with Yaws.** *Amer. J. Trop. Med. & Hyg.* 1952, Mar., v. 1, No. 2, 220–26. [17 refs.]

The concentration of total non-protein nitrogen and of total free amino-acid nitrogen was determined in the blood plasma of 8 Africans with yaws. The values found were significantly lower than those of controls. The individual amino-acids were separated by paper chromatography, identified and their concentrations measured. Certain amino acids not previously determined in human blood plasma were identified and listed. These included aspartic acid, cystine, proline and serine. The concentrations of cystine, glutathione and methionine were consistently higher in the blood of the yaws patients than in the controls. Treatment of 2 patients with S.T.B (4-oxy-3-acetoaminophenyl arsenoxide) restored the plasma amino acid concentrations to normal values.

It appears, though it is not yet established, that yaws is accompanied by a disturbance of nitrogen metabolism reflected in a lowering of the non-protein and amino nitrogen levels in the plasma. *J. H. Birkinshaw*

VINCENT, M. Gonflement osseux des phalanges et anémie d'origine pianique chez un enfant de trois ans. [**Bony Swelling of the Phalanges and Anaemia, Attributed to Yaws, in a Child of Three**] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 321–5, 2 figs. on pl. [10 refs.]

This is a report, from the Belgian Congo, of a severe hypochromic anaemia, probably of nutritional origin, enlarged liver, spleen and heart, polydactylitis of hands and feet and periostitis of the forearm bones in a small boy who, two years previously, had three yaws on his abdomen a month after playing with a child suffering from yaws. He had been ill for one month. Malaria parasites and hookworm ova were not found and sickling was not observed. The skull was normal. His serum Wassermann reaction was strongly positive.

He received 10 daily injections of procaine penicillin (300,000 units), a high protein diet, iron and injections of liver extract. A month later the anaemia and bone condition had greatly improved but the enlargement of the liver and spleen was unaltered.

Examination of a biopsy from a metatarsal revealed a chronic hypertrophic ossifying periostitis. There are good illustrations of a photograph and a radiograph of the polydactylitis.

[The abstracter can see no evidence that yaws had any causal relationship to the anaemia.] *C. J. Hackett*

LEPROSY

AUSTIN, C. J. **Fiji Leprosy Hospital, Makogai (Annual Report for the Year 1950).** *Fiji, Legislative Council. Council Paper No. 2.* 1952, Appendix 3, 15–21.

The Report begins with mention of the retirement of Mother Agnes on her 80th birthday after having served the patients at Makogai for 34 years. Mention also is made of the Leper Trust Board, through which New Zealand does so much for the patients in Fiji and throughout the South Pacific, and of the Conference held by the Board in the end of 1950. At Makogai the average number of patients throughout the year was 695·86, of which 444·44 were from Fiji, and the rest from the Gilbert Islands, W. Samoa, Cook Islands, Tonga and American Samoa (in this order of frequency) and one from New Zealand. Of the Fijian patients the average number of Indian patients was 259·62. Sulphetrone treatment [oral] was given to 539 patients. "In certain cases where sulphetrone was not tolerated oral diaminodiphenyl-sulphone (D.A.D.P.S.), has proved acceptable, and by the end of the year 46 patients were taking it." About 80 patients persisted with chaulmoogra injections in preference to sulphones ; these were mild cases, and the results, "though almost uniformly good, are not comparable with the sulphone figures". The most striking figures given are those showing improvement of all the patients, given in percentages, for each of the last 5 years : 1946=53·1, 1947=56·9, 1948=55·9, 1949=63·9, 1950=71·9. "Three Samoan patients, suffering from frequent attacks of filariasis, were transferred from sulphetrone to D.A.D.P.S. as a result of Muir's report of the beneficial result of D.A.D.P.S. in filariasis. All three have greatly improved, two of them having had no subsequent attacks, while one has had a single mild attack of filariasis following influenza."

Ernest Muir

SUZUE, K., ICHIDA, F. & IMAGAWA, G. **Some Contributions to the Pathology of Leper's Adrenal Glands, mainly about the so-called Ketosteroid Reaction.** *Acta Scholae Med. Univ. in Kioto.* 1952, v. 30, No. 1, 27–45. [34 refs.]

The material on which this Japanese investigation is based was collected from 31 autopsies of in-patients in a leprosarium and 16 control autopsies from 1947 to 1949. The results were complicated by the fact that the majority of the patients were at the same time suffering from tuberculosis as well as leprosy. Many also were suffering from malnutrition during that period. After eliminating these complicating factors as much as possible the author concludes as a result of his research that the adrenal cortex in leprosy shows a marked diminution of the substance which gives a positive reaction in the ketosteroid test, the diminution being most marked in the lepromatous type of the disease. Usually also the amount of 17-ketosteroid is decreased in the urine, especially in lepromatous cases. These results are found to be particularly marked when there are nodules in the adrenals. The changes in the adrenals are supposed to produce "a fatigued state of the leper's adrenal cortex". In leprosy "functional lowering is thought to exist already in the very early period".

Ernest Muir

GERNEZ-RIEUX, C., MONTESTRUC, E. & TACQUET, A. Application des réactions d'hémagglutination et d'hémolyse conditionnée au diagnostic sérologique de la lèpre. [**Application of Haemagglutination and Conditioned Haemolysis Reactions to the Serological Diagnosis of Leprosy**] *Bull. Acad. Nat. Méd.* 1952, v. 136, Nos. 22/23, 375–8.

An additional diagnostic method for leprosy is described. Leprosy patients' sera in various dilutions are tested against sheep cells with the help of two

antigens : tuberculin I.P.48 and the polysaccharide St isolated from tuberculin. The sera of 78 leprosy patients, not suffering from tuberculosis, were tested by this method. The results are shown in tables both in regard to agglutination and to conditioned haemolysis tests. While the sera of those with neither leprosy nor tuberculosis gave with titres of over 1 : 8 only 9·2 per cent. of agglutinations and 12·1 per cent. of haemolyses, those of the 78 leprous patients gave a much higher titre : the agglutination titres in 85·8 per cent. were above 1 : 8 with the two antigens, and the haemolysis titres were above 1 : 8 in 71·7 per cent. with the tuberculin antigen, and in 67·9 per cent. with the polysaccharide antigen. The height of the titre showed generally a direct relationship to the number of bacilli found, and a fall in proportion to improvement under sulphone treatment. But in 7 out of 13 patients in whom repeated bacteriological examination had failed to show bacilli the agglutination and induced haemolysis were definitely positive (between 1 : 16 and 1 : 128). *Ernest Muir*

Dharmendra & Chatterjee, S. N. **A Case of Leprosy wrongly diagnosed as Neurofibroma.** *Leprosy in India.* 1952, July, v. 24, No. 3, 160–63, 3 figs.

Foster, G. E., Kendrick, E. L., Walton, E. & Williams, W. D. **Ethyl Esters of Hydnocarpus Oil stabilised with Creosote.** *J. Pharmacy & Pharmacol.* London. 1952, Oct., v. 4, No. 10, 730–36, 1 fig.

Roy, A. T. **Diaminodiphenylsulphone in Leprosy.** *Leprosy in India.* 1952, July, v. 24, No. 3, 130–32.

The results of treatment with DDS orally and those when DDS is injected subcutaneously are compared. Ninety-eight patients were given DDS orally for an average period of 17·1 months, and 140 patients were injected subcutaneously with a suspension of DDS in oil for an average of 12 months. In the former the average amount of DDS per patient per year was 28·5 gm., and the number with improvement was 75 per cent. In the latter the average amount per patient was 19·38 gm. and the improvement was in 74·2 of the patients. It is concluded that "if the trouble of injecting the suspension is not taken into consideration, there is a great advantage in using the suspension of DDS parenterally. Here both the amount of the drug and the period of treatment are lessened to a great extent." *Ernest Muir*

Montel, L. R. Éruptions furonculoides, folliculaires, acnéiformes de poussées au cours du traitement de la lèpre par la sulfone-mère. [**Crops of Furunculoid, Follicular Eruptions in the Form of Acne during the Course of Treatment with DDS**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 480–85, 2 figs. on pls.

The characteristics of these eruptions are similar to those formerly described in patients treated with methylene blue : they are accompanied by fever, they are localized to blue-coloured lesions, the pus from them is always rich in bacilli, healing is followed by marked amelioration and a favourable prognosis, the violence of these attacks necessitates interruption of the course of treatment and the use of appropriate remedies. The clinical histories of 3 cases are described in which these eruptions occurred and in which the elimination of bacilli was accelerated by their occurrence. *Ernest Muir*

Dharmendra, Chatterjee, S. N. & Sen, N. **Treatment of Leprosy with Novotrone.** *Leprosy in India.* 1951, July, v. 23, No. 3, 154–60.

Novotrone is a drug similar to sulphetrone, though said to be made by a different process. It is made by an Indian firm of manufacturing chemists.

It can be given either orally or, as it is very soluble, by injections of a watery solution, 50 per cent. being found suitable. Twenty-seven patients were treated for less than a year, 15 being given intramuscular injections, and 12 oral administration. "All the patients showed clinical improvement ; the reaction was controlled and did not recur, and the lesions showed considerable subsidence.—A feature of special interest has been that considerable improvement was seen in all the 5 cases whose condition had not improved or had actually become worse under treatment with hydnocarpus oil for a number of years. None of the patients became bacteriologically negative, but in about half the cases, there was appreciable bacteriological improvement", an improvement which has not been expected in so short a time judging from experience with other sulphones. "Novotrone shares both the advantages and limitations of the other sulphones in the treatment of leprosy."

Detailed findings are shown in two tables. *Ernest Muir*

Dharmendra & Chatterjee, K. R. **Thiosemicarbazone in the Treatment of Leprosy.** *Leprosy in India.* 1952, July, v. 24, No. 3, 93–125. [19 refs.]

The authors begin with a description of p-acetyl-amino-benzaldehyde thiosemicarbazone, and quote the workers who have reported results of its use in leprosy. They then describe their own results in 52 cases, of which 9 were untreated neural cases, 27 untreated lepromatous, and 16 previously treated lepromatous cases. The dose was 50 mgm. daily rising to the amount tolerated, but not to more than 200 mgm.

"The patients have stood the drug well and there has been satisfactory clinical and bacteriological response." The average length of treatment was 10 months. There was urticaria in one case and allergic dermatitis in 3 ; in one of these patients the treatment had to be abandoned. In 4 patients there was lepra reaction coming on after small doses. In 2 of these desensitization was possible, but in the other 2 the treatment had to be abandoned.

Comparing this drug with sulphones in their results, the authors reached the following conclusions : it is useful as an alternative in patients who cannot tolerate sulphones ; there is further clinical and bacteriological improvement in patients who have ceased to make further progress on sulphones ; "a striking feature of the treatment with thiosemicarbazones has been the partial or complete restoration of sensation and a tendency for the growth of new hair in the affected parts" ; lepra reaction and erythema nodosum are less common than with the sulphones. *Ernest Muir*

Floch, H. & Sureau, P. La vitaminothérapie C dans la lèpre (formes tuberculoides réactionnelles). [**Vitamin C Therapy in Leprosy of the Reacting Tuberculoid Type**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 443–6.

Two cases of reacting tuberculoid leprosy are described and the effects on them of vitamin C. This was given in one case in the form of 500 mgm. injected subcutaneously every day except Sunday up to the total amount of 30 gm. The other patient was given 2 gm. intravenously for 10 days and then 500 mgm. twice a day by mouth till 31 gm. had been administered at the end of a month. There was much improvement in both cases, especially in the second. The authors propose to treat other tuberculoid cases with large doses of vitamin C, 2 to 4 gm. a day. The results are considered to be better than those with vitamin D_2. *Ernest Muir*

Lowe, J. **A.C.T.H. and Cortisone in Treatment of Complications of Leprosy.** *Brit. Med. J.* 1952, Oct. 4, 746–9.

ACTH and cortisone were used in two classes of complications : (1) allergy to chemotherapy and especially to treatment with sulphones, which shows itself by drug fever, dermatitis, and hepatitis which may go on to necrosis of the liver ; (2) excessive tissue reaction to the bacilli and their products with one or more of the following manifestations, acute leprous neuritis, acute leprous eye inflammation, lepromatous reaction. The number of cases treated by the author with these hormones up to February 10th, 1952, was 38 : sulphone dermatitis, &c., 4 cases ; acute neuritis 8 ; acute leprous eye condition 7 ; lepromatous reaction 16 ; tuberculoid reaction 1 ; leprous elephantiasis 1, acute leprous arthritis 1.

It was found that while acute manifestations of leprosy can be readily controlled by hormone therapy, there is a grave danger of aggravating the underlying disease, particularly in those receiving short courses of treatment, and even of aggravating the particular symptoms to alleviate which the hormone has been given. Thus the early results are good, and the late results too often bad. But in two serious complications of leprosy and its treatment the results were striking and " are usually attained with such small doses that hormone treatment is fully justified ". These are : (1) sulphone sensitivity with drug fever, dermatitis and hepatitis, giving 100 mgm. cortisone every 12 hours for two days, and then 50 mgm. every 12 hours for one day ; and (2) acute and subacute leprous eye inflammation, in which the local use of cortisone (eye-drops hourly by day and less often at night) appears to be effective and safe.

Ernest Muir

Fernandez, J. M. M. & Carboni, E. Bases de la moderna profilaxis de la lepra. Aislamiento, premunición y tratamiento preventivo. [**Bases of the Modern Prophylaxis of Leprosy. Isolation, Premunition and Preventive Treatment**] *Archivos Argentinos de Dermat.* 1952, July, v. 2, No. 3, 167–79. [19 refs.] German summary.

The campaign against leprosy recommended consists of isolation of all open cases, intensive treatment of all known cases of leprosy, treatment of suspected cases among contacts, and control and premunition of contacts. Isolation of open cases in institutions is not in itself sufficient ; provision must be made for their dependents, and especially for their children, who need also to be kept under observation and means taken to raise their resistance to leprosy.

Treatment of open cases, especially with sulphones, has the effect of rapidly rendering patients less infectious. It also has the effect of aborting the disease in contacts who are suspected of having contracted the disease. In this connexion two important experiments are described. In the first a group of 11 child-contacts of 5 to 12 years old, and whose lepromin tests were almost all negative, were given 4 courses of diasone of 20 days each with 10 days of rest between the courses. When 12 months had elapsed from the time when the first lepromin tests had been done it was found on repeating the tests that all had become more or less strongly positive. In the second experiment, 6 adults, and 17 children under 15, all with negative lepromin tests, were given courses of sulphone treatment. In 69·5 per cent. there was a mutation (became positive) in the late reading, and in the early reading (Fernandez) a mutation in 47·8 per cent. Both these experiments give evidence that sulphone treatment increases resistance in suspected leprosy contacts.

The third method of control recommended is systematic examination of all contacts with leprosy foci, testing their resistance to leprosy by means of the lepromin test. The premunition of those with negative lepromin tests through BCG vaccination is still a matter which is under investigation, but very hopeful results have already been obtained. Here the original work of the first author in 1939 is referred to, and the work of others more recently. [Much of this has recently been abstracted in this *Bulletin*.] It will be of particular interest to know if lepromatous cases of leprosv occur among those who have been 'correctly' vaccinated with BCG. Because, if experience shows that among them contagion occurs, but there are exclusively cases of the benign type, we shall be very satisfied that we have now demonstrated that BCG is able to provoke a state of comparative immunity which protects from a malignant infection. *Ernest Muir*

GRAY, C. T. **The Respiratory Metabolism of Murine Leprosy Bacilli.** *J. Bacteriology*. 1952, Sept., v. 64, No. 3, 305–13, 1 fig. [21 refs.]

"*Mycobacterium lepraemurium* separated in high purity from infected rat testicles shows an endogenous respiration but is unable to oxidize any one of fifty compounds tested.

"The respiration of murine leprosy bacilli, like that of tubercle bacilli, is damaged by anaerobic storage. This damage occurs in their terminal respiratory apparatus.

"Heat stable factors in yeast and liver stimulate and stabilize respiration of the bacilli. Proteins with a strong binding capacity such as bovine serum albumin and protamine stimulate and stabilize respiration but do not enable the bacilli to utilize substrates. There is an inverse relationship between the endogenous activity of suspensions and the relative stimulation induced by albumin.

"Suspensions fortified with albumin and yeast autolysate respire well for several days in the Warburg apparatus and make possible the long period studies needed to measure minimal contributions to their metabolism."

HELMINTHIASIS

WATSON, J. M. **Distribution, Importance and Prevention of Urinary Bilharziasis in the Valley of the Tigris and Euphrates Rivers.** Reprinted from *Lebanese Med. J.* 1952, Jan., 13–29. [17 refs.]

In this paper the author reviews the principal data which have resulted from his investigations on bilharziasis in the region of the Tigris and Euphrates Rivers and have already been described in detail in the series of published works entitled "Studies on Bilharziasis in Iraq" [noted in this *Bulletin*, from 1949, v. 46, 554 to 1952, v. 49, 413]. After a historical account of the subject, the epidemiology, distribution, treatment and control of the disease are discussed, and under the latter heading it is emphasized that the new irrigation schemes which have been planned, some of which are already under construction, "will inevitably add to the extent and gravity of the bilharzia problem by providing new habitats for the vector snails in the barren but potentially fertile land which will thus be brought under cultivation; as has already occured in Algeria and the Sudan". The economic and national need for the application of suitable counter-measures against this eventuality is pointed out, and also the control

of the great southern swamps " which are undoubtedly the breeding focus and source of the vector snails in the Tigris-Euphrates basin ". *J. J. C. Buckley*

SCHWETZ, J. Nomenclature simplifiée des mollusques africains vecteurs de bilharzioses. Suggestions pour une discussion raisonnée sur une future classification. [**Simplified Nomenclature for African Snail Vectors of Schistosomiasis. Basis for Discussion of a Future Classification**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 3, 381–8.

In view of the confusion at present existing in the taxonomy of molluscan vectors of schistosomes the author makes certain recommendations and suggestions. He discusses the relative values of classifications based on the structure of the shell, the internal anatomy of the snails and the biology of the snails. He maintains that the conchological classification is the more practical one and corresponds more closely with ecological variations than does the anatomical classification. He deplores the multiplicity of names in the literature and favours the suppression of many of them even to the extent of violating the law of zoological priority. The whole problem requires co-operation between the conchologist, the malacologist, the mollusc ecologist and the specialist in schistosomiasis. *J. J. C. Buckley*

GIRGIS, B. **Pulmonary Heart Disease due to Bilharzia : the Bilharzial Cor Pulmonale. A Clinical Study of Twenty Cases.** *Amer. Heart J.* 1952, Apr., v. 43, No. 4, 606–14, 3 figs.

Schistosomal pulmonary heart disease is seen in Egypt chiefly among adolescent or adult males who have suffered for many years from somatic schistosomiasis due to *Schistosoma haematobium* or to *S. mansoni*, or both. Repeated and massive pulmonary embolism of ova causes pulmonary arteriolar injury and an obliterative arteriolitis ; a sequel is the development of changes in the right heart due to a rise in the pulmonary blood pressure. These changes are dilatation of the trunk and main branches of the pulmonary artery, and hypertrophy of the right ventricle. Four per cent. of all cases of cardiac disease in the University Hospitals are of schistosomal causation. Twenty such patients ranging in age from 12 years to 40 years, of whom 16 were males and only 4 females, were studied. Their presenting symptoms in order of frequency were dyspnoea on effort, palpitation, dull aching in the praecordial region, epigastric pain, and cough and haemoptysis. The usual findings on more detailed examination are discussed ; case reports with copies of the electrocardiographic records and X-ray examinations of three patients are given as examples. [These should be studied in the original by those interested.]

A. R. D. Adams

GRACE, H. K. & AIDAROS, S. M. **The Pathogenesis of Intrapelvic Schistosomiasis with special reference to Bilharziasis of the Seminal Vesicles.** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, No. 6, 355–65, 7 figs. (6 on 5 pls.) [27 refs.]

Schistosomal tubercles of the urinary bladder and of the rectum as a rule occur initially in the submucous coats. They are " open " lesions, from which the ova successfully escape into the urine or the stools to the exterior. Later, as scar tissue forms, they cease to be " open " and tend to become " closed " lesions. In the seminal vesicles bilharzial tubercles initially are in the fibromuscular coat, and from the start are " closed " lesions ; very few ova escape into the vesicles and thence to the exterior. Many may be conveyed from this site through the systemic and portal circulations elsewhere, for example to the lungs. This may account for the greater incidence of extra-pelvic schistosomal lesions in males as distinct from females.

In 125 cases of schistosomiasis in males examined at autopsy, in a hospital in Egypt, 119 were found to have schistosomal involvement of the seminal vesicles. *Schistosoma haematobium* accounted for 112 of these, and a mixed infection with *S. haematobium* and *S. mansoni* for the other 7 ; no case of seminal vesicle involvement solely due to *S. mansoni* was found. On the histology 3 types of lesion could be distinguished ; a massive type ; a vesiculectasis type ; and an atrophic type. The prostate was involved in only 22 of the 125 cases. Calcification of the seminal vesicles was rare, even where there was very massive infection ; papillomatous and malignant changes were not seen, nor was secondary sepsis evident in these organs. The affection was almost invariably bilateral ; but no living or dead worms were recovered from infected seminal vesicles. The number of eggs in the latter was very much greater than was found in the other pelvic organs, and scar tissue formation was most marked. *A. R. D. Adams*

Hightower, J. A. & Bauman, P. M. **Failure of Aureomycin in the Treatment of Schistosomiasis.** *Amer. J. Trop. Med. & Hyg.* 1952, Sept., v. 1, No. 5, 852.

"Aureomycin did not prove to be an effective therapeutic agent in this group of patients with schistosomiasis."

Fain, A. *Biomphalaria alexandrina tanganyicensis* (E. A. Smith 1881) transmetteur de *Schistosoma mansoni* au Lac Albert. [*Biomphalaria a. tanganyicensis* **as a Transmitter of** *S. mansoni* **at Lake Albert**] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 217–20.

The author's summary in French is translated freely as follows :

Biomphalaria alexandrina tanganyicensis (Smith, 1881) has been found infected with cercariae of *Schistosoma mansoni* at Lake Albert, and laboratory-bred specimens of this snail were proved to be susceptible to infection by exposure to miracidia of *S. mansoni*. *J. J. C. Buckley*

Olivier, L., Vaughn, C. M. & Hendricks, J. R. **Schistosomiasis in an Endemic Area in the Dominican Republic.** *Amer. J. Trop. Med. & Hyg.* 1952, July, v. 1, No. 4, 680–87, 2 figs.

"A study was made of the endemic area of schistosomiasis mansoni at Hato Mayor in the Dominican Republic. *Australorbis glabratus*, the snail host for *Schistosoma mansoni*, seems to have a very restricted distribution in the vicinity of Hato Mayor. Numerous *A. glabratus* were found in streams close to the town but none was found in other streams up to 20 kilometers from the town. Many of the snails harbored cercariae which developed into adult *S. mansoni* in mice. Examination of a single stool from each of 243 children between the ages of 5 and 15 living in Hato Mayor revealed 52 infections with *S. mansoni*.

"It is concluded that a serious endemic focus of schistosomiasis mansoni exists in the vicinity of Hato Mayor, and that the disease is being acquired by a relatively large proportion of the children of the town. Because the endemic area is apparently restricted to narrow geographic limits, it is considered especially well suited for a study on the use of molluscacides in the control of schistosomiasis mansoni."

KUNTZ, R. E. **Exposure of Planorbid Snails from the Western Hemisphere to Miracidia of the Egyptian Strain of** *Schistosoma mansoni*. *Proc. Helminthological Soc. of Washington*. 1952, Jan., v. 19, No. 1, 9–15.

"The exposure of several species of planorbid snails from the western hemisphere to the miracidia (from infected school children) of the Egyptian strain of *Schistosoma mansoni* indicates :

"1. That *Australorbis glabratus* from Venezuela and Puerto Rico are equally susceptible to infection and the rates of infection fall within the range recorded for *Biomphalaria boissyi*, the natural vector of *S. mansoni* in Egypt.

"2. *Tropicorbis havanensis* from Louisiana can be infected under favorable circumstances.

"3. *T. havanensis* from Cuba, exposed under identical conditions with *T. havanensis* from Louisiana, was refractory, as were *T. pallidus* from Venezuela and *T. albicans* from Puerto Rico.

"4. *Tropicorbis obstructus* from Guatemala can be infected, if one considers the presence of poorly developed sporocysts, a satisfactory criterion of infection.

"5. Much more investigation of this type is necessary to explain geographic relationships of hosts and parasites. A brief discussion is given concerning host-parasite relationships."

ERRATUM

In the abstract of the paper by EVANS and STIREWALT on "Variations in Infectivity of Cercariae of *Schistosoma mansoni*" [this *Bulletin*, 1952, v. 49, 779], line 12 of paragraph 1 ". . . autopsied after 4 weeks" should begin ". . . autopsied in the seventh week of the infection" and the word "potency" in lines 1, 2 and 3 of the last paragraph should read "patency".

FAIN, A. & LAGRANGE, E. Valeur curative des dérivés du Thioxanthone (Miracil D et Nilodin) dans les cas de parasitisme intense par *Schistosoma mansoni*. [**Therapeutic Value of the Thioxanthone Derivatives Miracil D and Nilodin in Heavy Infections by** *S. mansoni*] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 221–7.

Of the 322 African inhabitants of 4 small villages on the shores of Lake Albert (Belgian Congo) 211 proved to be passing *Schistosoma mansoni* eggs ; none of them had had specific treatment for their infection for some years. Twenty-two adults (9 women and 13 men) and 11 children (from 6 to 14 years of age) among those most heavily parasitized were removed to Bukwa, a non-infected area, and taken to hospital. Three of the 33 had slight liver enlargement ; another had more marked liver enlargement with splenomegaly and ascites ; but none of the patients had albuminuria.

Sixteen of the patients were treated with Miracil D, given orally in pills, and 17 were similarly treated with tablets of Nilodin. The gross dosage of either drug was 120 mgm. for each kgm. of body weight ; this was divided into doses given twice daily over a period of 5 to 8 days. About half the patients complained of giddiness, headache, nausea and a few also of vomiting and diarrhoea ; in no case were the toxic side-effects so severe as to necessitate stoppage of the treatment ; their incidence was similar with both drugs.

The stools were examined daily throughout the treatment and during the 3-month period for which these patients were detained in hospital after treatment, and the numbers of eggs passed each day were estimated by a simple counting technique. Twice each week, beginning a fortnight after the end of the drug treatment, stool concentrations were done ; and the proportion of viable eggs present was determined by a hatching technique. It was observed that at

Bukwa, which is 1,800 metres above sea-level, hatching consistently took place after a much longer delay than was the case at the lake level, though the temperatures and amount of sunlight were similar at the two levels [this is to be the subject of a further communication].

In all cases the number of eggs passed in the stools diminished by the 5th to the 8th day after the completion of the treatment ; where they vanished they did so by the 10th to the 15th days. Fifteen of the 33 patients passed no living eggs after the 15th day, though most of these continued to pass occasional dead and degenerate eggs ; in 4 of these 15, living ova reappeared in the stools before the 3-month period of the experiment was up. Thus 11 patients of the 33 apparently were free from parasites by the end of 3 months of observation. A provocative dose of 0·03 gm. per kgm. of Bayer 205 [Suramin] was given to these and the stools were re-examined by a concentration method ; this showed that only 3 of the 33 patients (about 9 per cent.) apparently were cured, living ova being recovered by this test from another 8 patients.

Nine patients who did not cease to pass living eggs were re-treated after a month ; 3 of these apparently ceased to pass living eggs as a result of the re-treatment, but the provocative test with Bayer 205 reduced the number of apparent cures to nil.

The cure rate of the thioxanthone drugs in moderately severe Mansonian schistosomiasis therefore is low. *A. R. D. Adams*

McMULLEN, D. B. **Schistosomiasis and Molluscacides.** *Amer. J. Trop. Med. & Hyg.* 1952, July, v. 1, No. 4, 671–9. [18 refs.]

Laboratory and field plot tests were carried out with a large series of chemicals against *Oncomelania nosophora*. A total of 413 mixtures, each containing 0·5 mgm. of 10 different chemicals was used, and proved a rapid and satisfactory method of finding promising compounds. Separate samples, numbering 1,675, were also tested. In the laboratory tests the author's modified plate technique (*J. Parasitol.*, 1949, v. 35 (Suppl.), 28) was followed and involved the use of 96,270 snails, while in the field pilot tests with the more promising chemicals, the procedure was the same as previously described (*Annual Historical Report*, 406th Med. Gen. Lab., 1948, 3), and 64,736 snails were used. Observations on some of the active compounds after these had been determined, led to trials with dual mixtures and some of these were found to be more toxic than separate samples, *e.g.*, a mixture of copper sulphate and sodium pentachlorophenate. The results of the tests are summarized in 3 tables. In the laboratory tests the phenol compounds predominated among those listed as having the greatest molluscicidal activity. Of these the dinitrophenols are the most active and best represented but only 2 of the halogenated phenol compounds are in the " most active " category and only 2 organic phosphates.

" In the field experiments reported here the inverse ratio of amount of chemical and the per cent kill is best among the dinitrophenols, but other compounds may prove to be more practical. The primary problem for the chemists and commercial organizations is to suggest suitable formulations of the active compounds that will be economically feasible and relatively safe to handle. The best combination probably would be one that could be mixed with water for spraying. It may be that some of the less active compounds can compete with those that are very active. This would depend on the cost of effective amounts. For example, in previous experiments (McMullen *et al.*, 1951) it was found that sodium pentacholorphenate can compete with 2-cyclohexyl-4,6-dinitrophenol even though approximately four times as much is needed to get comparable control." *J. J. C. Buckley*

Macfarlane, W. V. **Schistosome Dermatitis in Australia.** *Med. J. Australia.* 1952, May 17, v. 1, No. 20, 669–72, 3 figs. [15 refs.]

"1. In Australia swimmers' itch occurs in the Wagin lakes of Western Australia and along the swamp waters of the Murray River. A similar parasitization is reported from near Sydney.

"2. In the Murray region the organism concerned is *Cercaria parocellata* Johnston. The host pulmonate is *Limnaea lessoni.*

"3. Primary non-allergic and secondary allergic lesions occur as a result of the invasion of the cercaria. In primary lesions antibodies appear after five to eight days, and the cercaria is extruded in desquamated epidermis. With secondary lesions tissue antibodies are present and papules appear in eight to twelve hours. The parasite is destroyed by leucocytes.

"4. Hypersensitized subjects show during two hours after infestation an accelerated papular response. Cercarial secretion used as an antigen induces both accelerated and delayed papules.

"5. *Cercaria parocellata* and *Cercaria longicauda* are antigenically similar, but *Cercaria jaenschi* behaves heterologously to give no accelerated response and a reduced delayed reaction.

"6. Protection against invasion is given by dimethyl phthalate cream. Antihistamine cream alleviates the itching secondary lesions, but the papules remain."

Stunkard, H. W. & Hinchliffe, M. C. **The Morphology and Life-History of *Microbilharzia variglandis* (Miller and Northup, 1926) Stunkard and Hinchliffe, 1951, Avian Blood-Flukes whose Larvae cause "Swimmer's Itch" of Ocean Beaches.** *J. Parasitology.* 1952, June, v. 38, No. 3, 248–65, 1 text fig. & 11 figs. on 2 pls. [37 refs.]

"A dermatitis of fishermen and bathers in the Narraganset Bay area of Rhode Island is caused by the cercariae of avian schistosomes. The larvae, which develop in simple sporocysts in the mud-snail, *Nassa obsoleta,* are identified as *Cercaria variglandis* Miller & Northup, 1926. The dermatitis is similar clinically to 'sea-bather's eruption' as reported in New York, Florida, California and Hawaii. It has been produced by *Cercaria variglandis* in persons sensitized to this species and in others, sensitized to larvae of fresh-water schistosomes but with no previous exposure to marine cercariae. The antigenic substances of marine and fresh-water avian schistosomes are therefore very similar if not identical. Sexually mature worms, recovered from the mesenteric veins of experimentally infected canaries, pigeons, gulls and ducklings, are morphologically identical with specimens found by Chapin in the lesser scaup duck, *Marila affinis,* in Maryland and described as *Microbilharzia chapini* by Price, 1929. In a preliminary report Stunkard and Hinchliffe designated the parasite *M. variglandis* (Miller and Northup, 1926)."

Orris, L. & Combes, F. C. **Clam Digger's Dermatitis. Schistosome Dermatitis from Sea Water.** *Arch. Dermat. & Syph.* 1952, Sept., v. 66, No. 3, 367–70, 1 fig.

Several cases of this eruption have occurred in clam diggers who "arm" or "toddle" clams in the salt water of Long Island sound.

"Arming" for clams is done in shallow water at low tide, the "armer" lying across the rowing boat and scooping in the mud for the clams. If protective clothing is not worn the eruption appears on the parts of the skin previously immersed in water.

The case is reported of a young man who "armed" hard clams in Cold Spring Harbor. A few hours after doing so he experienced intense itching of the upper extremities, followed the next morning by a papular urticarial eruption on the itching areas. Individual lesions varied in diameter from 7 to 10 mm. and clinically resembled a lenticulopapular syphilide. He continued to clam for 5 days with the result that the rash got considerably worse and he developed fever and malaise.

The patient was treated symptomatically with cold compresses, a lotion, and penicillin injections. Within 24 hours he had improved considerably, and 7 weeks later the rash had cleared except for some residual pigmentation, slight infiltration and superficial desquamation.

Clinically the eruption in clam diggers is identical with reported cases of schistosome dermatitis (swimmer's itch). Waterfowl are common in Cold Spring Harbor and are parasitized by the adult schistosomes. Miracidia hatch from the ova excreted in the faeces, enter snails, their intermediate host, and emerge as cercariae. Cercariae do not penetrate the skin while man is immersed in infested water, but only later as the thin film remaining on the skin slowly dries. When the cercariae enter the skin dermatitis results. Since, however, man is not the natural host for this type of schistosome, the cercariae are destroyed with involution of the lesions and no systemic infection results.

H. T. H. Wilson

Abbott, R. T. **A Study of an Intermediate Snail Host (*Thiara granifera*) of the Oriental Lung Fluke (*Paragonimus*).** *Proc. U.S. Nat. Museum.* Wash. 1952, v. 102, No. 3292, 71–116, figs. 32–45 & 2 pls. [17 refs.]

The introduction, a few years ago, of *Thiara granifera* into Florida, where it became established in Lithia Spring, led to the present study of its anatomy, bionomics and specific identification. Field observations and collections were made on Guam Island, the Marianas and the Philippines as well as at Lithia Spring. The external and internal anatomy are described in detail and illustrated. An account is given of its geographical distribution, habitats and bionomics. Dissection of specimens from many localities revealed infection with heterophyid cercariae in 20 per cent. of those from the Philippines. The Lithia Spring colonies showed no infection. Information as to the parasites transmitted by *T. granifera* is summarized. The list includes the two human helminths, *Metagonimus yokogawai* and *Paragonimus westermani*.

The geographical origin of the introduced snails is obscure but it is thought unlikely that the species will become widespread in the United States and that its public health importance is negligible.

J. J. C. Buckley

Catchpole, B. N. & Snow, D. **Human Ectopic Fascioliasis.** *Lancet.* 1952, Oct. 11, 711–12. [16 refs.]

The authors record the case of a woman in Manchester, suffering from swelling of the abdominal wall, first located in the right iliac fossa, then—two days later—migrating to the right lumbar region, and thence to the right costal margin. Operation revealed that the swelling was attached to the skin, the superficial part being hard and nodular, and the softer part being tethered to the aponeurosis of the external oblique. When excised, the mass was found to contain an immature *Fasciola hepatica*. No ova were recovered from the duodenum and faeces. There was an initial eosinophilia of 744–978 per cmm., which fell, during emetine treatment of 18 days' duration, to 792. In two weeks it was 336 per cmm. and in 6 months it was 82 per cmm.

The location and migration of the parasite is discussed, with references to previous cases of ectopic fascioliasis. No source of infection could be traced and it would seem that infestation had been contracted in the Manchester area. This appears to be only the second case recorded in Britain.

H. J. O'D. Burke-Gaffney

VON BONSDORFF, B. & GORDIN, R. **Antianemic Activity of Dried Fish Tapeworm. *Diphyllobothrium latum* and Pernicious Anemia XIII.** *Acta Med. Scandinavica.* 1952, v. 142, Suppl. 266, 283–92, 9 figs.

The fish tapeworm, *Diphyllobothrium latum*, when present in the proximal part of the intestine, is able to interfere with the interaction of the extrinsic and the intrinsic factors. It is not known how this interference takes place. There are several possibilities ; that the tapeworm by virtue of a toxin interferes with a hypothetical, though improbable, enzymatic reaction between the two factors ; that the tapeworm " arrests the process of absorption " of the anti-anaemic factor ; that it inhibits the production of intrinsic factors ; or that it consumes the intrinsic or extrinsic factors. It has been shown that neither fresh (not living) nor dried tapeworms will interfere with the anti-anaemic effect in Castle's test ; this observation is against the toxin hypothesis. The present investigation was carried out to test the probabilities of another hypothesis, namely, that the tapeworm consumes the extrinsic factor.

Fish tapeworms were recovered both from patients with and those without tapeworm anaemia ; these worms were dried to about one-tenth their fresh weight, powdered, and administered to 5 patients with cryptogenetic (Addison's) pernicious anaemia and 4 with pernicious tapeworm (*Diphyllobothrium*) anaemia in daily doses of 5 to 10 gm.

In the 5 cases of cryptogenetic pernicious anaemia the response was similar to that obtained by the oral administration of 5 μgm. of vitamin B_{12} ; there was no antianaemic effect when the dried tapeworm was given alone, but a maximal or submaximal effect when it was given with 100 ml. of neutralized normal gastric juice. In 2 of the 4 cases of pernicious tapeworm anaemia, the administration of dried tapeworm caused a maximal response, in one a submaximal response, and in one no response.

The authors conclude that evidence has been provided that the worm assimilates a considerable amount of vitamin B_{12} ; this they consider might provide the explanation of why the tapeworm in certain circumstances causes a pernicious form of anaemia.

L. E. Napier

COUTELEN, F., BIGUET, J., DOBY, J. M. & DEBLOCK, S. Le système musculaire de scolex échinococcique. Mécanismes de dévagination et d'invagination du rostre et des ventouses. [**The Muscular System of the *Echinococcus* Scolex. Mechanism Evagination and Invagination of the Rostillum and Suckers**] *Ann. Parasit. Humaine et Comparée.* 1952, v. 27, Nos. 1, 2 & 3, 86–104, 12 figs. on 7 pls.

The authors' summary in French is translated freely as follows :—

In this account, we describe the musculature of the *Echinococcus* scolex. It was studied both in living specimens, suitably cleared, and by histological sections. Both completely developed normal scolices and those showing degenerative changes were examined. The complicated muscle system is made up of numerous fibres, amongst which it is often difficult to distinguish myoblasts closely associated with parenchymatous cells, cells with calcareous corpuscles, flame cells of the excretory system and duct cells. Only the myoblasts of the

cushion of the rostellum and suckers are clearly visible. It is possible, however, in the fresh state, to discern the muscle fibres themselves and their interrelationships and to classify them in 4 functional groups : (*a*) a subcuticular group for evagination, (*b*) a group for operating the suckers, (*c*) a group for operating the rostellum and hooklets, and (*d*) a deep-seated group for invagination.

The knowledge of the function and topography of this muscular system which is made possible by the small dimensions of the *Echinococcus* scolex, should be of help in the comparative study of the scolex in larval and adult Taeniid cestodes and explains the special mechanism of invagination and evagination of the rostellum and suckers of *Echinococcus* in particular.

[The paper is illustrated by 4 drawings and 8 photomicrographs.]

J. J. C. Buckley

Rao, K. A. **Hydatid Cyst Liver—Rupture into Alimentary Canal.** *J. Indian Med. Ass.* 1952, Sept., v. 21, No. 12, 520–21.

Sprent, J. F. A. **Anatomical Distinction between Human and Pig Strains of *Ascaris*.** [Correspondence.] *Nature.* 1952, Oct. 11, v. 170, 627–8, 8 figs.

Hitherto no morphological feature has been recorded which distinguishes *Ascaris lumbricoides* as a species separate from that of the ascaris parasite of the domestic pig.

The author, while in Ontario, examined 50 specimens of human *Ascaris* and compared them with specimens from pigs obtained from an abattoir. Photographs show that the denticles of the pig ascaris form a prominent row of triangular structures, with straight edges : the human variety has less conspicuous denticles, which are smaller, with rounded edges. Even in specimens from the pig, where the denticles are apparently rounded by wear, the difference is evident. Where worn denticles were seen in the human ascaris, only the ridge was evident.

The author suggests that similar studies should be made of specimens from other parts of the world.

H. J. O'D. Burke-Gaffney

Beckett, A. H. & Dombrow, M. **The Determination of Ascaridole in Oil of Chenopodium and in Solution of Oil of Chenopodium in Castor Oil.** *J. Pharmacy & Pharmacol.* London. 1952, Oct., v. 4, No. 10, 738–45, 3 figs. [18 refs.]

East Africa High Commission. **Filariasis Research Unit. Annual Report, 1951** [Laurie, W., Director]. 105 pp., 4 figs. [Numerous refs.]

This is the annual report of a unit established to study all aspects of filariasis in East Africa. Field surveys have been made in many parts of Tanganyika Territory by means of blood films taken after 8 p.m. Filariasis is very common in the warm damp parts of the Territory but absent from the higher areas around Arusha and Moshi. [For details the original report should be consulted.]

Microfilariae have been found in the blood of two infants less than 12 months old, and elephantiasis has been seen in children of 11–13 years. The infection is somewhat more common in males than in females. The average number of microfilariae per unit volume of blood is, however, about the same in both sexes, nor does it increase much in the higher age-groups. Filariasis is more common in Africans than in Asiatics. There is no evidence for a higher rate of infection in larger families. Fifteen per cent. of patients with hydrocele had microfilariae in the blood, and so did 3·1 per cent. of those with elephantiasis. An attempt was made to study the economic disability imposed by filariasis.

In the Eastern Province 63 per cent. of the men with elephantiasis and 39 per cent. of those with hydroceles were unfit for work on some days during the year. Men with hydroceles had fewer children than those without, suggesting some hindrance to reproduction. Elephantiasis and hydrocele certainly constitute a heavy drain on the Territory's hospital facilities. Tests with skin reactions or with complement-fixation techniques were not reliable for diagnosis, about 20 per cent. of positive patients being missed by the skin test. Crude extracts of the *Dirofilaria immitis* antigen were less unreliable than those which were lipoid-free. *D. immitis* antigen was better than *Onchocerca* antigen.

Much attention has been devoted to treatment, especially by hetrazan. After 10–20 mgm. hetrazan base per kgm. have been given by mouth, the blood concentration rises to about 4 μgm. per ml. in about 3 hours and then falls to undetectable levels by about 8 hours. Excretion in the urine can be detected for 28–55 hours according to the dose. In 32 hours about 45–60 per cent. of the (single) dose is excreted in the urine. [These findings are similar to those of LUBRAN, this *Bulletin*, 1950, v. 47, 1020.]

In order to investigate whether treatment with hetrazan will increase or decrease the liability to hydrocele or elephantiasis, two groups of symptomless carriers have been treated and they will be followed during the coming years. As is well known, hetrazan is very effective in permanently reducing the microfilaria count and examples of this are given in two large groups treated at Kyela and Ukara respectively. The total microfilaria count in each group was reduced by 96–99 per cent. when they were examined about 12 months later. Whenever possible the total dose was over 70 mgm. base per kgm. In careful trials it was shown that hetrazan has no significant effect upon hydrocele or elephantiasis.

Trials were also made of protostib (N-methyl glucamine antimoniate) which contains 27 per cent. Sb^v. It is given by intramuscular or intravenous injection and 80 per cent. of the antimony is excreted in urine in 24 hours. One hundred and sixty-four patients in Ukara were given 240 mgm. per kgm. during 10 days by intramuscular injection. Late in this course, complaints were commonly made of fever, headache and pains in the joints, limbs and groin. Often these seemed to be due to an allergic reaction. Four patients showed mild exfoliative dermatitis, which cleared up spontaneously when the drug was stopped. Four months later 25–30 per cent. of the patients had become free of microfilariae and the total number of microfilariae had been reduced by 50–80 per cent. As a much longer period of follow-up than this is required to evaluate the full results of antimonial treatment, these findings indicate that the treatment has probably been effective in killing the adult worms. However, protostib is too expensive and too toxic to be of use in field eradication of filariasis. Protostib has probably no value for the treatment of hydrocele or elephantiasis.

Arsenamide was given to 8 patients, but there has not yet been time to follow them up.

Studies have been commenced on the mosquito transmission of *W. bancrofti*. The local *Culex fatigans* is not a good vector in the laboratory although infective larvae can complete their development in it in some cases.

A valuable brief account of the ocular lesions in onchocerciasis is contributed by Dr. R. MCKELVIE [this must be consulted in the original]. Seventeen patients were treated with massive doses of hetrazan. Intense allergic reactions occurred but there was no evidence that these caused damage to the eyes. It is safe to give hetrazan to onchocerciasis patients showing no eye lesions or only early ones. A good account of the eradication of *Simulium neavei* by means of DDT added to the relevant streams is given by Mr. J. P. MCMAHON [for this, the original should be consulted]. *F. Hawking*

See also p. 5, Peel, Mestdagh & Mathieu, Note sur la fréquence du paludisme et des filarioses au Centre extra-coutumier de Costermansville. [**Note on the Incidence of Malaria and Filariasis in the "*Centre Extra-Coutumier*" at Costermansville**]

Beye, H. K., Edgar, S. A., Mille, R., Kessel, J. F. & Bambridge, B. **Preliminary Observations on the Prevalence, Clinical Manifestations and Control of Filariasis in the Society Islands.** *Amer. J. Trop. Med. & Hyg.* 1952, July, v. 1, No. 4, 637–61, 2 figs. & 1 graph. [35 refs.]

The purpose of this study was to learn more concerning the epidemiology and endemicity of filariasis, particularly on the islands of Tahiti and Maiao. The second major objective was to compare the relative efficiency of several methods of controlling transmission of filariasis from November, 1948 to September, 1950.

Tahiti is the largest and most important of the Society Islands between 149 and 154° longitude and 16 and 18° S. latitude. It is roughly 105 miles in circumference and occupies some 600 square miles.

Papeete contains some 15,000 inhabitants, 5,000 Chinese and approximately 2,000 Europeans also inhabit Tahiti. The island is well watered and the principal industries are copra and fishing.

Maiao, 60 miles W. of Tahiti, volcanic, much smaller, and with one small mountain of 900 feet, is surrounded by a reef and populated entirely by Polynesians.

The people chosen for study were selected from 9 areas comprising small communities and containing a cross section of the rural population, predominantly Tahitian. The number of persons averaged 4·4 to 8 per house. All localities had essentially the same physical properties, the land being flat or sloping gently toward the ocean ; but in some areas the mountains are closer and border the lagoon. There are no cattle or horses on Maiao.

Adult mosquito populations were determined by making observations at three "resting" and three "biting" stations in each area.

Three recordings were made during a period of 2 to 4 weeks prior to control measures. Collections at "biting" stations were made between 1 and 2 p.m. and at "resting" stations between 8 and 9 a.m. Mosquitoes were dissected for filariae stages prior to establishment of control measures.

The indices used to determine the effect of rural control measures on the inhabitants and on transmission were as follows :—

(1) The percentage of persons positive for microfilariae before and after treatment.
(2) The average number of microfilariae per 20 cmm. of blood per person.
(3) The frequency distribution of microfilarial counts.
(4) The number of lymphangitis attacks per person.
(5) Larval mosquito density.
(6) Adult mosquito density.
(7) The filarial rate in mosquitoes.

In those areas in which only DDT or sanitation was employed it is obvious that no conclusions could be drawn in a short period concerning their influence on the control of the disease.

A comparison between the mosquito populations and average number of infective larvae in them, before and during the course of the experiment, should provide information concerning differences in the transmission rate.

Control measures by hetrazan consisted of giving the drug at the rate of 2 mgm. per kgm. body weight three times daily for 7 days. The subjects were

checked at monthly intervals for attacks of lymphangitis and given a physical examination at 6 months and one year.

Sanitary measures were directed to mosquito breeding places as well as to drainage. Five per cent. DDT emulsion in water was applied to the interior of the houses once every 3 months, while the exteriors and all shrubs within 20–30 yards were sprayed with 1 per cent. DDT.

The average total percentage infected with microfilariae for all areas before the inauguration of control measures was 32·17. The highest figure in area VI, in Tahiti, was 58·3 ; the lowest, on Maiao, 26·1. The control measures themselves were varied in different areas. The first area with a percentage of 38·6 was kept as a control. In area II all microfilaria-positive subjects were treated with hetrazan, in area III there was mass treatment ; in IV, sanitation alone ; in V, treatment of positives+sanitation ; in VI, DDT only ; in VII, treatment of positives+DDT ; in VIII, sanitation+DDT ; in IX, treatment of positives+sanitation+DDT ; in X treatment of positives and an equal number of negatives.

For the prevalence of filariasis, 369 subjects were examined in 7 areas, and 40 per cent. of inhabitants of Maiao. The following criteria were considered diagnostic : elephantiasis, palpable epitrochlear glands in those over the age of 10, varicocele, hydrocele or greatly enlarged lymphatic glands. Forty-one per cent. of Tahitians exhibited clinical signs of filariasis while an additional 15 per cent. were found to be asymptomatic carriers.

The most interesting facts derived from the extensive tables presented are : that no male was free from signs after the age of 50 ; that the percentage of palpable epitrochlear glands was 41 per cent. for males and 20 per cent. for females—a difference that cannot be explained by age distribution. No single sign served as an index of prevalence.

Two hundred and fifty-four Tahitians who did not receive treatment were followed at monthly intervals for one year in order to obtain data on prevalence and frequency of attacks of lymphangitis : 37 gave a history of previous attacks, 19 of whom had them during the year of observation and 18 did not.

In terms of total population the attack rate was 0·34 attack per person per year while in terms of those having attacks the average number was 3·5. Analyses of blood surveys of persons positive for microfilariae showed that of those 5 years of age and older in Lower and Upper Paea, 35·4 and 28·2 per cent. respectively were positive.

The specific rates of those positive for microfilariae increased with age : thus 72·4 per cent. of those 50 years or older were positive. Positive adults harboured more microfilariae per individual than children, the highest average percentage being in the 40–49 year age-group. The youngest positive was a 14-month-old baby. The greatest concentration in a patient was in a man of 42 with 1,094 microfilariae in 20 cmm. blood.

In the 7 areas, 39·81 per cent. of males were positive as compared to 32·73 females but on Maiao the percentages were nearly equal (26·6 per cent. and 25·4 per cent. respectively) ; but there was a significant difference in microfilarial concentration between sexes : the males had an average count of 130·4 microfilariae per 20 cmm. as compared with an average of 66·7 for females.

Mosquito observations.

Nine species of mosquitoes were present in the collecting areas, but only 3 species, *Aëdes pseudoscutellaris*, *C. quinquefasciatus* [*C. fatigans*] and *C. annulirostris*, were present on Maiao. The first two species were found in the largest numbers in all areas.

Breeding places of many kinds are listed, the most important being rat-eaten coconuts. Included in the list are outrigger canoes, tyres, bamboo stumps, sea shells, leaf axils and crab holes.

The blood of 220 animals and birds examined for microfilariae showed dogs and cats (56·5 and 12·5 per cent.) to be infected with *Dirofilariae immitis*. Of the adult filariae recovered in man, 7 males, 6 females and one immature were found in a varicosity in the inguinal region of one Tahitian ; 10 adults were recovered at autopsy from a Rarotongan male. Specimens of both sexes were studied morphologically and conformed to the type descriptions of *Wuchereria bancrofti*.

Effect of hetrazan on microfilariae.

The results of the several methods of control on the percentage of persons with microfilariae before, and at 6 and 12 months after, control measures were commenced are shown in an elaborate table.

As expected in 3 areas where no treatment was used no perceptible reduction occurred during the year. The combined percentages of positives before application of control measures and at 6 and 12 months for the three groups where treatment was not given, were 41·0, 43·3, and 44·2 respectively. A noticeable drop occurred in the percentage of positives in each of 4 areas where hetrazan was administered. The percentage positives for all 4 treatment areas before the application of control measures and at 6 and 12 months were 34·4, 21·5 and 19·6 respectively and most of those positive had very low microfilarial counts after treatment ; but comparison of those positive before and after treatment does not show the effect of hetrazan so clearly as does a comparison of the actual numbers of microfilariae per 20 cmm. of blood of persons examined. From the figures given in a table the average number of microfilariae per person examined was less than 10 per cent. of the original number.

The effect of hetrazan on clinical filariasis.

It was particularly difficult to analyse the figures with regard to the frequency of lymphangitis attacks. On the whole the frequency of attacks in each experimental area showed no striking change.

The effect of treatment on other manifestations of clinical filariasis showed that 70 treated persons had the same signs as before. No evidence was obtained that the drug caused enlargement or reduction of the epitrochlear glands nor had it any effect on the elephantoid lesions.

In general, hetrazan was well tolerated by most subjects. The first type of reaction was noted on the 3rd and 4th days, was more severe in older persons, and included pyrexia, pruritus, headache, pains in abdomen, joints and femoral areas.

The second type of reaction appeared 3–15 days later and consisted of pruritus, enlarged painful lymph glands, scrotal enlargements, urticarial skin eruptions and even bullae.

Transitory albuminuria was noted.

Mosquito populations.

Twice-monthly adult mosquito surveys were made at 3 resting and 3 biting stations throughout 14 months. Little or no decrease was found in the adult mosquito population in those areas where neither sanitation nor DDT was used. It would appear from the data given in an elaborate table that the application of sanitation alone, or of DDT alone, is less successful in reducing *Aëdes pseudoscutellaris* than *C. fatigans*.

Infective filarial larvae in dissected mosquitoes.

Only results of dissections of *A. pseudoscutellaris* are reviewed.

The results which are justifiably certain appear to indicate that in the control area I no significant reduction could be ascertained. In areas II–IX, where

experimental measures were employed, reductions in the percentage of mosquitoes with infective larvae became apparent. Thus in area III a percentage of 10 was reduced in 12 months to 0·6 per cent.

It is stated that the data are still too few to draw statistically significant conclusions regarding the superiority of any single method employed in this study, though the infective filaria larval index in mosquitoes has merit as a means of evaluating the effectiveness of a mosquito control programme, providing the collection of mosquitoes can be standardized. The variable factors are the proximity of collecting stations to infected persons, the microfilarial index, and factors involving the bionomics of mosquitoes, seasonal and climatic variations. Many points have to be taken into consideration in an attempt to formulate and evaluate a programme for control of filariasis which must necessarily extend over a long period of time. At present it is not possible to say to what extent the success of a programme can be judged by :—

(1) Making periodic counts of microfilariae in the treated populations.
(2) Evaluating a mosquito control programme, or
(3) Determining the infective filarial larval index in a mosquito population at regular intervals.

It will require years of further study in order to determine any reduction in clinical manifestations of filariasis which may ensue as the result of the measures adopted. Although the incidence of microfilariae in carriers has been reduced the importance of low density carriers in transmission of filariasis is not properly understood.

[It has been a privilege to review this important communication which is the most thorough and extensive prophylaxis ever undertaken in filariasis. The modest and judicious claims of the results should be assessed as an index of permanent value.

It was not possible for these workers to have become familiar with the important entomological work of Marks (this *Bulletin*, 1952, v. 49, 168) on the varieties of *Aëdes scutellaris* in the Pacific. It is probable that *Aëdes pseudoscutellaris* in Tahiti is in fact *Aëdes polynesiensis*. In view of the work of J. J. C. Buckley on possible morphological distinctions of the adult Pacific filaria (*ibid.*, 1061), it might also be advisible to re-examine the Tahitian specimens.]

Philip Manson-Bahr

Jachowski, L. A., Jr. & Otto, G. F. **Filariasis in American Samoa. II. Evidence of Transmission outside of Villages.** *Amer. J. Trop. Med. & Hyg.* 1952, July, v. 1, No. 4, 662–70, 4 figs.

These studies were undertaken in 1948 in American Samoa in order to develop methods for the control of filariasis caused by non-periodic *Wuchereria bancrofti*. Most villages in Samoa follow the same basic plan. Usually situated on the coast or along the main road, the houses are arranged round the village green (*malae*) which is cleared of undergrowth. The Samoan house consists of a single room carpeted with coral pebbles and covered by a high thatched roof. There are no permanent side walls but woven blinds can be lowered.

The bush, which usually commences immediately behind the cooking-shed, may be jungle, coconut or banana groves, with luxuriant undergrowth.

Ten villages were included in this survey : 9 on the island of Tutuila and one on adjacent Aunuu. Four collecting stations were established in each village. (*a*) On the open *malae* (or green) near the centre, approximately 25 yards from the nearest house ; (*b*) in one house selected at random ; (*c*) on a trail in the nearby bush 50–100 yards from the houses and (*d*) further along a trail in the

bush usually in banana or coconut plantation, 150 to 250 yards from the houses. All collections were made within a period of 90 minutes on a single afternoon.

On arrival at collecting stations, the collectors, using aspirator-type collecting tubes, endeavoured to collect all mosquitoes attempting to feed on them in a period of 10 minutes.

Over 1,700 mosquitoes were collected. These with an extra 649 obtained on special surveys were dissected for larvae of *W. bancrofti*. Comparatively few larvae of *D. immitis* were found and are excluded from the data. *Aëdes pseudoscutellaris* was shown primarily to be a bush mosquito as it was most abundant at those stations located at greatest distance from the village and least abundant on the open *malaes*.

In the villages where the underbrush of steep mountainsides encroach on the houses many more mosquitoes were collected near or in the bush than in those with extensive surrounding cleared areas.

The incidence of infection of mosquitoes does not show the well-marked distribution pattern with the village as described by Byrd *et al.* [this *Bulletin*, 1945, v. 42, 479]. The percentage of infected mosquitoes was 6·9 on the *malae*, 5·2 in the houses, 2·9 in the nearby bush and 4·9 in the deeper bush.

Separation of the infections according to the types of village again emphasizes the minor rôle of the houses of open villages in the transmission of filariasis.

In the bush itself the frequency of infected mosquitoes appears to be related to the amount of native traffic. Infected mosquitoes were never found in those areas where there was no evidence of recent human visitations.

Density of mosquitoes must be taken into consideration. Thus because of low density, 11·1 per cent. infection from the *malaes* of the open villages is based on the examination of relatively few mosquitoes whereas 3 per cent. infection in places 75 to 150 yards in the bush in reality represents many more.

The index of transmission is obtained by multiplying the density (average number per survey) by the proportion of mosquitoes infected. Application of this index to the data radically alters the interpretation of the importance of various areas in transmission and it appears that mosquitoes in the open *malaes* and in houses are of little importance as compared with those in nearby bush or in houses close to bush. The index of transmission is very high for mosquitoes in bush 175–275 yards from the centre of all villages. The data demonstrate that *Aëdes pseudoscutellaris* is found more plentifully associated with wild or natural cover than with that provided by human habitations.

It thus appears that in Samoa at least an hour in the bush offers greater opportunity for infection than can occur in the remaining 23 hours spent in the village. Only in small villages or coves or in thick bush does the index of transmission suggest any appreciable domestic transmission. The age and sex distribution of microfilaraemia in Samoans, added to the habits of the people, or the biting habits of the mosquito, all support this conception.

The non-domestic transmission is found also in *W. malayi* and it is stated that wherever *Culex quinquefasciatus* [*C. fatigans*] is the principal vector of the nocturnal periodic form the infection is apparently maintained by domestic transmission. As in the case of malaria a proper understanding of the habits and habitat of the principal vector is essential for the development of effective control. Consequently in American Samoa residual spraying of native houses cannot be expected to result in any measure of control. The attack on the mosquito must be focused in the bush.

[In this summary it has not been possible to refer adequately to the graphs upon which the data are based. It is probable that the vector in American Samoa is, as stated by Marks, *Aëdes polynesiensis* (this *Bulletin*, 1952, v. 49, 168).

It is gratifying to the reviewer that some of the conclusions arrived at by these American observers are in line with those he obtained in his recent work in Fiji.] *Philip Manson-Bahr*

JAYEWICKREME, S. H. & NILES, W. J. **A Technique for rearing *Mansonioides* Larvae in the Laboratory.** Reprinted from *Ceylon J. Sci.* (Sect. B.) 1952, May 31, v. 25, Pt. 1, 1–6, 4 figs. on pl.

"1. Larvae of *Taeniorhynchus* (*Mansonioides*) *uniformis* and *T.* (*M.*) *annuliferus* have been successfully reared to the adult stage on *Salvinia cucullata* or *Pistia stratiotes* in a medium containing guinea-pig dung in tap water (pH 7·0). A rich culture of micro-organisms, consisting of motile and non-motile bacilli and protozoa, is thus obtained, in which the early stages develop rapidly.

"2. It has been found that 3·75 gm. of dried, powdered and sieved, guinea-pig dung in 500 ml. of tap water are sufficient to rear 25 larvae to the adult stage.

"3. Two vessels containing the medium are set up together. One serves for rearing the larvae in, while the other is used for adding 10 ml. of centrifuged micro-organisms daily to it.

"4. With this technique *T.* (*M.*) *uniformis* has been reared to the seventh generation."

JANSSENS, P. G. Remarques au sujet de la possibilité de manifestations nerveuses ou psychiques causées par les filarioses. [**Observations on the Possibility of Nervous and Psychic Manifestations due to Filariasis**] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 229–34. [14 refs.]

Since LORENTZ (1890) first declared that filariasis was responsible for sudden death attributable to central nervous system involvement a number of workers have from time to time reported neurological complications of the same origin in man and in primates. The literature on this subject is reviewed ; it appears from this that in the case of man the manifestations are those of hemiplegia, meningitis, encephalitis, or psychic involvement. KIVITS [see below (1953) p. 52] alone has reported cases of encephalitis with a syndrome of encephalitis of a lethargic type which ends fatally coincidentally with invasion of the cerebrospinal fluid by microfilariae. At necropsy the pia matar was oedematous, and the lateral ventricles were dilated ; on histological study a form of granuloma formation, which often was located perivascularly, was seen in the nervous tissue. Kivits suspects that the encephalitis possibly favours the escape of the microfilariae into the cerebrospinal fluid, rather than that it is a consequence of their escape ; but his observations are of the greatest interest and they give a lead to further research into the matter, which can profitably be followed in the areas of high endemicity of filariasis. *A. R. D. Adams*

KIVITS, M. Quatre cas d'encéphalite mortelle avec invasion du liquide céphalo-rachidien par *Microfilaria loa.* [**Four Fatal Cases of Encephalitis with Invasion of the Cerebrospinal Fluid by Microfilariae of *L. loa***] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 235–42.

Loa loa and *Acanthocheilonema* [*Dipetalonema*] *perstans* infections are very prevalent in the African population of Mayumbe (Belgian Congo). In at least a quarter of the adult population microfilariae of one or other of these parasites can be seen in the peripheral blood. While *A. perstans* larvae are less commonly seen, and then in smaller numbers, than those of *L. loa*, the latter often are very numerous and may number 600 in 20 cm. of blood. The larvae are rarely

seen in the bloods of children under 10 years of age, but nevertheless these children suffer from Calabar swellings and the adult worms may appear under their conjunctivae. Similarly, European newcomers with only a few months' residence in the area may have Calabar swellings, eosinophilia and nerve pains, but microfilariae cannot be found in their blood.

The pathological effect of *Loa loa* infection is usually regarded as slight ; it is limited to the production of swellings, to the unpleasant feelings due to wandering of the worms, chiefly under the conjunctiva, to skin irritations, and to neuritic manifestations. But it is remarkable that the presence in the capillaries of 30 or more microfilariae, each in length 40 times the diameter of a red cell, should not cause difficulties in the capillary circulation. At surgical operations living or calcified adult worms are often seen in the serous membranes and in the adjacent tissues ; these cause some cellular reaction. Ten or more living worms, and some calcified dead worms, not uncommonly are found at operations for a hernia or hydrocele ; the affected connective tissue is thickened and lax, and it is particularly prone to post-operative infection so usually it is removed.

In spite of the frequence of heavy blood infections with microfilariae of *L. loa* these organisms have only once before been reported in the cerebrospinal fluid, though from time to time during the thousands of lumbar punctures done in sleeping sickness areas an occasional microfilaria is found there and is assumed to have been introduced accidentally during the performance of the puncture.

Four cases of a clinically encephalitic syndrome, all of them fatal, in local Africans were seen by the author ; in each case substantial numbers of microfilariae were found in the cerebrospinal fluid. These cases are described in detail, and the post-mortem findings of one are also detailed. The relevant features in all four were the presence of larvae in the fluid, which otherwise showed no very gross departure from normal. Three of the patients were treated with hetrazan without clinical benefit ; in only one of the three were closer observations made ; in this case though the microfilariae soon vanished from the blood those in the cerebrospinal fluid did not seem to be affected by the treatment.

In view of the absence of red cells, which would suggest contamination with blood possibly from a meningeal haemorrhage, the microfilariae in the cerebrospinal fluids of these cases presumably penetrated actively into the meningeal spaces. There was no evidence of trypanosomiasis, and as two of the patients were juveniles it is unlikely there was syphilis ; in both these conditions vascular lesions occur. It is not unreasonable to assume that the encephalitis favoured the penetration of the microfilariae into the cerebrospinal fluid as a secondary event. But encephalitis of this type has not otherwise been encountered in Mayumbe, and it might be that the entry of microfilariae into the meningeal spaces caused the encephalitis in these four cases. Obviously the matter remains in doubt and requires further study of similar cases in regions where *L. loa* is endemic ; the possibility of a virus infection as the precipitating factor should also be investigated. *A. R. D. Adams*

Ten Berg, J. A. G. Filariasis loa. Behandeling met Hetrazan. [**Treatment of *Loa loa* Infections with Hetrazan**] *Nederl. Tijdschr. v. Geneesk.* 1952, Sept. 27, v. 96 (iii), No. 39, 2411–17, 3 figs. on pl. [12 refs.]

The English summary appended to the paper is as follows :—

" Case-histories of eight missionaries from the Cameroons and the Congo who suffered from an infection with Filaria loa. Six of them also had an infection

with filaria perstans. Loa-loa reacted well to hetrazan, perstans not at all. Living worms were removed from the skin in two cases, one day and a fortnight after the beginning of treatment respectively, while in the fourth week of treatment four dead worms were removed from the skin of a third patient. It is stressed that in some cases filaria loa may exert a serious influence on the general condition of the patients."

See also p 70, MARLIER, **Fish Feeding on Simulium Larvae.**

ONABAMIRO, S. D. **On the Diurnal Migration and Seasonal Fluctuation in the Numbers of** *Thermocyclops nigerianus* **Kiefer in a Nigerian Pond.** *Ann. Trop. Med. & Parasit.* 1952, May, v. 46, No. 1, 38–47, 4 figs.

"1. A short review is given of some of the work previously done on the diurnal migration of freshwater copepoda.

"2. A description is given of an investigation in a Nigerian pond of the diurnal migration and seasonal fluctuations in the numbers of *Thermocyclops nigerianus*, which a previous investigation has shown to be the species commonly infected with the larvae of *Dracunculus medinensis* in Nigeria.

"3. Throughout the day the greatest numbers of *Th. nigerianus* were found near the bottom of the pond, but in the afternoon and evening the species migrated both from the bottom and from the surface to the intermediate level.

"4. The greatest numbers of *Th. nigerianus* in the pond were found at intervals of about nine weeks."

KOURÍ, P. & VALDÉS DÍAZ, R. Concepto actual sobre el papel patógeno del Tricocéfalo dispar (*Trichuris trichiura*). Sintomatología gastro-intestinal, particularmente ceco-apendicular y recto-sigmoideana. [**Present Views on the Pathogenicity of** *Trichuris trichiura*] *Rev. Kuba Med. Trop. y Parasit.* 1952, Apr.–May–June, v. 8, Nos. 4, 5 & 6, 37–41. [20 refs.]

Two strongly opposed opinions prevail on the rôle of *Trichuris trichiura* as regards its pathogenicity. One makes light of the infestation regarding it as little more than a harmless commensal; the other believes that it may be markedly pathogenic, causing inflammation, ulceration and in some cases resulting in death. The authors describe a condition which they designate "massive infantile trichuriasis" which resists all treatment and ends fatally. Inflammation of the descending colon and the sigmoid occurs, with haemorrhages and mucopurulent stools and often with rectal prolapse. In less severe cases treatment with hexylresorcinol 1 in 300 (Santokin 15 cc. in 300 cc. water) administered by enema brings about cure.

Symptoms may be produced when *Trichuris* is the only parasite present, but naturally they are aggravated when there is *E. histolytica* or *Balantidium coli* infection also. The massive infestation is commonest in children between 1 and 5 years of age. When there is intense inflammation, prolapse and ulceration, the worm may be present in hundreds, and the nausea, vomiting and diarrhoea lead to serious and rapid wasting [or, as the authors call it, dehydration] and death. Such massive collections are seen in the caeco-appendix or sigmoid and rectal regions, or the hepatic and splenic flexures and the lower ileum.

The delivery of the paper was followed by a discussion in which 7 doctors took part, largely supporting the authors, from their own experiences. Dr. Reinaldo TOGORES in particular gave detailed figures of the ages of the patients, the sex ratios, the various symptoms, together with the results of treatment. Finally, Professor Kourí replied to each of the participants in the discussion.

H. Harold Scott

JUNG, R. C. & JELLIFFE, D. B. **The Clinical Picture and Treatment of Whipworm Infection.** *West African Med. J.* 1952, Jan.–Feb.–Mar., v. 1 (n.s.), No. 1, 11–15, 1 pl. [10 refs.]

Whipworm (*Trichuris trichiura*) infection is one of the commonest cosmopolitan worm infections. Its presence is frequently ignored, yet it is capable of causing severe symptoms. Heavy infections cause diarrhoea with blood-streaked stools, abdominal pain, tenesmus, loss of weight, and sometimes a hypochromic anaemia. Chronic infections may cause rectal prolapse. Light infections cause allergic symptoms and milder degrees of the above symptoms.

The critical worm-load appears to be about 1,000 worms, indicated by 100 eggs per 2 mgm. smear ; above this symptoms will usually be definite. The author suggests that in weak ill-nourished African children the symptomatic threshold may be lower.

For the treatment of heavy infections hexylresorcinol enemata are recommended, 500 to 700 ml. of 0·2 per cent. in water or glycerin solution. The patient is prepared by a cleansing enema, after which his perineum, buttock, and thighs are smeared with petroleum jelly to prevent burning of the skin. The enema is given slowly and should be retained for half to one hour. One treatment is usually sufficient. This treatment is effective but expensive. A cheaper and simpler but less effective treatment is oral tetrachlorethylene and oil of chenopodium ; 2·7 ml. and 0·3 ml., respectively, for an adult [4 ml. of tetrachlor-ethylene can be given with safety], followed within two hours by a saline purge. *L. E. Napier*

GILL, A. J. & SMITH, Alice L. **Presence of *Enterobius* (Oxyuris) *vermicularis* in the Ovary.** *Amer. J. Clin. Path.* 1952, Sept., v. 22, No. 9, 879–82, 3 figs.

" Two cases are reported in which the ovary was the site of a granulomatous lesion caused by *Enterobius vermicularis*.

" The lesions were incidental findings and did not produce any symptoms. The parasite probably reached the abdominal cavity by direct migration from the perineum through the internal genitalia."

GAASE, A. Die serologische Trichinose-Diagnose bei der Mescheder Epidemie im Herbst 1950. [**The Serological Diagnosis of Trichiniasis in the Epidemic in Meschede in the Autumn of 1950**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1952, Aug. 31, v. 109, No. 6, 453–61. [24 refs.]

An epidemic of trichiniasis involving 436 people in Meschede, Westphalia, occurred in 1950 and was due to the importation of an infected pig from Poland. In diagnosis use was made of the complement-fixation reaction on which a number of reports have been made. Blood counts were also used in diagnosis. Sera from 417 patients were examined and 86·5 per cent. of these were found to be positive. Of those patients with positive sera, 86·98 per cent. had clinical symptoms of infection. (These data are also set out by age and sex.)

The test is found to give a high percentage of positives even in the first week of the disease.

In the course of the investigation of the epidemic over 1,000 sera were examined and among these, 156 positives were found in persons who had no sign or symptom of the disease and are not included among the 436 cases. These 156 positive sera were from 121 persons engaged in the butchery trade and who may therefore have been latent infections and 35 persons in whom no definite cause of infection could be traced. It is admitted that these 35 positives might be due to a lack of specificity in the test but this, judging

from the author's own investigation and the work of others, is considered not to be the explanation. *M. E. Delafield*

POOLE, J. B. **A Survey of the Incidence of Trichinosis in Rats in B.C.** *Canadian J. Comp. Med.* 1952, Aug., v. 16, No. 8, 291–3.

"While the results of this three year investigation did not duplicate the high percentage of infection found in rats from piggeries by Moynihan and Musfeldt, the results still appear to be of importance to the public health investigator. They definitely establish the fact that *Trichinella spiralis* is wide-spread in wild rats in the coastal areas of British Columbia although the infection rate is small (5·83%). If we accept the statements of previous investigators that the rat primarily becomes infected from eating infected pork, it appears that there is also a moderate distribution of trichina amongst the hogs of this region."

STONER, R. D. & HALE, W. M. **Effect of Cobalt^{60} Gamma Radiation on Susceptibility and Immunity to Trichinosis.** *Proc. Soc. Exper. Biol. & Med.* 1952, July, v. 80, No. 3, 510–12, 1 fig.

"1. Cobalt^{60} gamma whole body irradiation of 550 to 650 (rep) increased the susceptibility of Swiss mice to infections with *Trichinella spiralis*. 2. Exposure of Trichinella-immune mice to 600 (rep) before administering a challenge infection destroyed their immunity to reinfection. 3. Data are presented on the effects of 680 (rep) radiation upon the total leukocyte count in the peripheral blood of mice. The sharp reduction in the number of circulating leukocytes may indicate that the role of cellular immunity should be emphasized more in acquired immunity to infections with *Trichinella spiralis*."

DEFICIENCY DISEASES

DE WIJN, J. F. **A Nutritional Survey of the Toradja Population (Central Celebes) compared with other Agrarian Populations in Asia.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1952, June, v. 4, No. 2, 149–70, 1 map & 7 graphs. [24 refs.]

This paper describes the diet, anthropometric data (heights and weights) and vital statistics of a relatively isolated poor rice-eating community living in an agricultural area in the Central Celebes in which malaria is endemic. It is concluded that "(*a*) the appallingly high death rate among the younger people and the unfavourable findings at medical examination of prospective recruits, (*b*) the poor resistance to infections of the respiratory tract and (*c*) the retardation in development, especially in adolescence, are the direct results of poor nutrition in youth". The general picture will be familiar to students of South-East Asia, but the details are clearly and succinctly set out and the paper will be of great value to health authorities and in addition the agricultural, educational and military departments in the Celebes. *R. Passmore*

CLARKE, C. A. & SIRCUS, W. **Nutritional Neuropathy in Prisoners-of-War repatriated from Hong-Kong. A Follow-Up.** *Lancet.* 1952, July 19, 113–14.

In 1946 at the Royal Naval Hospital in Sydney, Australia, Clarke saw 74 recently released prisoners-of-war suffering from gross neurological disorders

attributable to malnutrition. This paper reports a follow-up of 29 of these men, 6 years later.

Of the 29 patients 26 had some disturbance of vision, 15 assessed as severe, 11 as mild. For the most part these have remained unchanged. The scotomata and optic atrophy have persisted irrespective of the degree of involvement.

There were 10 patients with deafness : 6, classified as severe, had not improved, but 4 with mild deafness were all improved or completely recovered. Posterior-column lesions affected 18 patients : those severely affected were unimproved, but some in the mild group had recovered. The most obvious improvement was in the peripheral nerve series. All those with mild lesions were improved and some completely recovered. *R. Passmore*

HAMMOUDA, M. & SIDKY, M. **Pyridoxine, an Essential Factor in the Restoration of Muscle Power of Egyptian Pellagrins.** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, No. 7, 413–26, 6 figs.

"1. The muscle power of Egyptian pellagrins is proved to be very much below normal, and improves only on the administration of pyridoxine.

"2. The muscle power of Egyptian pellagrins responds promptly to pyridoxine in both the individual strength of the contractions and in the total work done.

"3. At present the Egyptian pellagrins leave the hospital with a very low muscle power, and are unable to carry out their manual work with a resulting incapacitation of earning their living, and liability to relapse into further nutritional deficiency.

"4. As in the present treatment of pellagra no consideration is made for the restoration of the muscle power, we recommend a course of pyridoxine by mouth."

GILLMAN, Joseph & GILLMAN, Theodore. **Perspectives in Human Malnutrition. A Contribution to the Biology of Disease from a Clinical and Pathological Study of Chronic Malnutrition and Pellagra in the African.**

This book was reviewed in this *Bulletin*, 1952, v. 49, 1166.

QUIOGUE, Elena S. **The Rice Enrichment Project in Bataan, Philippines.** *Amer. J. Pub. Health.* 1952, Sept., v. 42, No. 9, 1086–94, 2 charts. [18 refs.]

This is a straightforward summary of the beriberi problem in Bataan, Philippines, and the use of enriched rice as a prophylaxis. The account can be recommended to those unfamiliar with the project. The basic data have already been published elsewhere and abstracts are available [see this *Bulletin*, 1949, v. 46, 390 ; 1950, v. 47, 73, 560 ; 1951, v. 48, 494 ; 1952, v. 49, 791]. *R. Passmore*

MCGREGOR, I. A. & SMITH, D. A. **A Health, Nutrition and Parasitological Survey in a Rural Village (Keneba) in West Kiang, Gambia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, July, v. 46, No. 4, 403–27, 1 map & 6 figs. [18 refs.]

That in many rural areas in the tropics the people are poorly nourished and at the same time carry a heavy burden of parasites is well known. But the effect of many common tropical parasites on the state of nutrition and general health of the human host is largely unknown. The Medical Research Council's Field Research Station in the Gambia have begun a study which should provide an accurate assessment of the part played by parasites in the production of

the ill-health and sub-nutrition so common in Gambia. In a selected village, Keneba, the plan is to eliminate the common parasitic diseases by the swiftest practical means with a minimum of interference with existing agriculture and social and economic life. This paper presents the finding of the base-line survey. In as much as the villagers frequently suffer a hungry season, the children are undersized, clinical evidence of insufficiency of the B group of vitamins in the diet is widespread, malaria is hyperendemic, large numbers of the people carry hookworms and filarial worms and both round worms and trypanosomal infections are present in a few, the village has clearly been well chosen for the experiment. Until the results of the eradication of the parasites become available, the details of incidence are of only local interest. One condition, however, was found which will give rise to great general speculation. Enlargement of the liver was common, occurring in 50 per cent. of the children aged 0–2 years, just over 40 per cent. of children aged 2–5 years, and 25 per cent. of those aged 5–10 years and thereafter much less frequently. The authors have not been able to study this hepatomegaly in Keneba, but quote an unpublished report by WALTERS and WATERLOW from Fajara, also in the Gambia, who have studied an apparently similar liver enlargement.

"The earliest changes appear to be periportal cellular infiltration and histiocytic proliferation. A general increase in reticular density appears to begin round, and to spread from, the portal tracts. No distortion of the lobule is obvious. The hepatic cells often look normal. . . . Fatty infiltration of the liver is completely absent in many cases of all ages, including those at, and prior to, weaning. When present, the degree is usually minimal, fat droplets being seen in a few cells near the periphery of lobules. This clearly distinguishes the pathology of Gambian hepatomegaly from that of kwashiorkor. . . ."

Unlike kwashiorkor, the onset of Gambian hepatomegaly is not associated with weaning, being common in breast fed infants. The incidence follows closely the incidence of blood films positive for malaria and falls off at an age when a relatively effective immunity against malaria is established. It is suggested that malaria may be the main cause of Gambian hepatomegaly, although other factors, probably nutritional, contribute. *R. Passmore*

VAN OYE, E. & CHARLES, P. Contribution à l'étude de la fonction hépatique chez le noir africain. VI. La cholestérolémie. [**Study of Liver Function in Africans. VI. Blood Cholesterol**] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 297–304.

Assessments of serum cholesterol in Africans have been made by means of Bloor's technique. A table showing the individual values is given. The mean figure (mgm./100 cc.) for 200 adults of unstated ages is 117, for 180 children 93 and for 200 new-born infants 66. This hypocholesterolaemia, which may manifest itself from birth throughout life, is probably caused by a number of factors. Undernutrition and disorders of the liver probably play a specific rôle. Chronic malaria may be a contributory factor. The intervention of a racial factor is rejected. *R. Passmore*

VAN OYE, E. & CHARLES, P. Contribution à l'étude de la fonction hépatique chez le noir africain. VII. La phosphatémie. [**Study of Liver Function in Africans. VII. Blood Phosphorus**] *Ann. Soc. Belge de Méd. Trop.* 1952, June 30, v. 32, No. 3, 305–10.

In a study of 600 Africans the levels of blood phosphorus were shown to be within normal limits. The levels of alkaline phosphatase were in general higher

than normally found in Europeans. Mean values for alkaline phosphatase were 5·98 units in the new-born, 6·27 in children and 6·36 in adults, but the range extended from 1 up to 20 units. The significance of the high values so often found in the African is at present unknown. *R. Passmore*

RAMALINGASWAMI, V., SRIRAMACHARI, S. & TULPULE, P. G. **Hepatic Cholesterol Content in Nutritional Disorders.** *Lancet.* 1952, Oct. 4, 661–2, 2 figs. [18 refs.]

The cholesterol content of the liver in kwashiorkor and nutritional oedema varied from 1·4 to 10·4 per cent. of weight of dry tissue (8 biopsy and 4 necropsy samples). In all the specimens there was histological evidence of fatty infiltration of the organ. The considerable accumulation of cholesterol in some cases bore little relation to the severity of the fatty infiltration. It is suggested that the accumulation of cholesterol is not simply incidental to fatty infiltration, but that a specific disturbance of cholesterol metabolism may exist. *R. Passmore*

MANSON-BAHR, P. E. C. **Fijian Kwashiorkor.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1952, June, v. 4, No. 2, 97–106, 6 figs. [20 refs.]

Sixteen cases of kwashiorkor in Fiji are described in which the clinical features resemble closely the disease in Africa. The social aetiology is interesting. All the cases occurred among Fijians and none in the immigrant Indian population. There are an equal number of Indians and Fijians and among the Indian population there is not a little vitamin deficiency disease and iron deficiency anaemia. The Fijians, on the other hand, are in the main a well-nourished race. Kwashiorkor only occurred at the age of weaning and nearly all the Indian population have access to a supply of cow's milk, which is available at weaning. Their neighbours, the Fijians, keep no cows. Traditionally children are suckled for 24 to 36 months ; by this time the child is able to struggle for its food and presumably acquires enough protein. During suckling the parents were separated and the mother abstained from cohabitation. This custom is now breaking down : as a result mothers now become pregnant while still suckling and the infant's natural milk supply may thus be abruptly terminated. No cow's milk or other suitable high protein food is available and so kwashiorkor may develop. The paper is illustrated by 5 photomicrographs and one photograph. *R. Passmore*

BERESOWSKI, A. & LUNDIE, J. K. **Sequence in the Time of Ossification of the Carpal Bones in 705 African Children from Birth to Six Years of Age.** *South African J. Med. Sci.* 1952, June, v. 17, No. 1, 25–31, 2 figs.

In African children, the capitate and the hamate bones appear earlier and the remaining carpal bones later than in American Negro or European children. Malnutrition may be a factor responsible for delayed carpal ossification in Africans after 2½ years. Tables show in detail the range of variability of the time of appearance of the centre of ossification of each carpal bone. *R. Passmore*

HAEMATOLOGY

WELBOURN, H. F. **Haemoglobin Estimations in African Children attending Welfare Clinics in the Vicinity of Kampala.** *East African Med. J.* 1952, Apr., v. 29, No. 4, 131–7, 1 fig. [14 refs.]

This is an investigation on 799 children aged one week to 10 years who were attending Welfare Clinics and Nursery Schools in the vicinity of Kampala, Uganda. About 70 per cent. of the children were indigenous Ganda, the remainder belonged to immigrant families from North and East Uganda, Kenya and Ruanda. Practically all the children under 6 months of age were breast-fed and appeared healthy with weights comparing favourably with European standards. At about the sixth month, the supply of breast milk usually became inadequate and the supplements offered consisted largely of carbohydrate and were poor in protein content. Thus most of the children over 6 months of age were suffering from the effects of malnutrition.

In addition to haemoglobin estimation all children's bloods were examined for malaria parasites and were accordingly divided into 2 groups comprising all ages : 460 without malaria and 339 where malaria was diagnosed. Intestinal parasites seemed to be of no importance during the first year of life.

The 460 children not suffering from malaria showed at birth in the first week about the same haemoglobin level as is found in England but although they were of healthy appearance their haemoglobin fell to a lower level than noted in England and was between 10–11 gm. per cent. within the first 3 to 4 months of life. At this level it remained throughout the first year to start rising slowly from the second year onwards. The author suggests that the fall of haemoglobin in the first 3 months is greater in African infants than in European because these children were growing extremely fast up to the age of 4 months. A possible other cause is that they may have had lower iron stores because of widespread anaemia among the mothers.

Throughout all periods of life beginning with the second month the haemoglobin level of infants suffering from malaria was significantly lower than that of the non-affected children. [This work, therefore, serves to underline the paramount importance of parasites as the cause of severe anaemia in Africa, and, as far as children are concerned, particularly that of malaria parasites. It confirms for East Africa what has been done in West Africa by MCGREGOR and SMITH (above, 1953, p. 57).] *H. Lehmann*

JALILI, M. A., DEMARCHI, M. & ABDUL-RAHMAN ABDUL-GHANI. **Haematological Studies on Cirrhosis of the Liver.** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, No. 7, 427–47. [28 refs.]

Fourteen male and 5 female healthy Iraquis showed the same haematological values as those found in healthy Europeans and Americans : seventy-two cases of liver cirrhosis were examined haematologically and divided into 66 with and 6 without ascites [the number is mistakenly given as the reverse in the introduction] : twenty-eight of the ascites cases were not or only slightly anaemic, the remaining 38 showed haemoglobin values below 10·5 gm. per cent., 13 of them ranging at 7 gm. per cent. and below. Thus severe anaemia was present but not a permanent feature. When it was found there seemed to be some association with severe ankylostomiasis but there was no correlation between ankylostomiasis and the clinical progress. Of the 66 cases with ascites, 30 had an increased mean corpuscular red cell volume ; there was no definite correlation between macrocytosis and parasitic infestations. However, when hypochromia was found (39 cases) it was usually associated with these conditions.

Of 50 cases of cirrhosis with ascites 39 had a serum albumin below 3 gm. per cent., and 22 of the 26 macrocytic anaemia cases whose serum protein was measured showed this hypoalbuminaemia. Among the patients with cirrhosis there was a high rate of achlorhydria (Ewald's test meal) and of increased erythrocyte sedimentation rate (corrected for anaemia). *H. Lehmann*

Foy, H., Kondi, Athena, Rebello, A. & Martins, F. **The Distribution of Sickle-Cell Trait and the Incidence of Sickle Cell Anaemia in the Negro Tribes of Portuguese East Africa.** *East African Med. J.* 1952, July, v. 29, No. 7, 247–51, 1 map. [13 refs.]

In this study, 1,260 inhabitants of Portuguese East Africa were examined for the sickle-cell trait ; they belonged to 16 different tribes. There was a striking contrast between two tribes, the Makondas and Makuas living in the north-east of the territory and all the other tribes examined. They were pygmoids with a slight steatopygia and spoke an archaic Bantu language. The trait incidence in 210 of them was 39 per cent. In the remaining 14 Bantu tribes examined the incidence was never more than 4 per cent. and in all these 1,050 persons together was less than 2 per cent.

Sickle-cell anaemia was diagnosed by the presence of sickle-cells in the peripheral blood and the development of long filamentous cell processes after not more than 12 hours incubation at 37°C. ; these tests were found positive in 9 of the 82 sickle-cell trait carriers discovered among the 210 Makuas and Makondas. Eight of these 9 were babies under 2 years old and one was an adult about 18 years old. *H. Lehmann*

Heyman, A., Patterson, J. L., Jr. & Duke, T. W. **Cerebral Circulation and Metabolism in Sickle Cell and other Chronic Anemias, with Observations on the Effects of Oxygen Inhalation.** *J. Clin. Investigation.* 1952, Sept., v. 31, No. 9, 824–8, 1 fig. [19 refs.]

Humphreys, J. **Ovalocytosis in a Nigerian Soldier.** *West African Med. J.* 1952, July–Aug.–Sept., v. 1 (n.s.), No. 3, 136–8, 1 fig.

DERMATOLOGY AND FUNGUS DISEASES

Clarke, G. H. V. **A Note on Dermatitis Cruris Pustulosa et Atrophicans.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Sept., v. 46, No. 5, 558–9, 1 fig.

The author describes a pustular dermatitis of the legs in Africans in Nigeria and illustrates it with a photograph.

Usually the anterior tibial surfaces are affected symmetrically, though the thighs and forearms were concerned in one case. On an area of atrophic skin small pustules are seen and these are about the size of millet seeds. The margins are commonly well defined. Only staphylococci have been isolated and blood serology is usually negative. There is sometimes a hypochromic anaemia.

Biopsy shows acanthosis and parakeratosis with vesication of the stratum corneum, especially around hair follicles. There is papillary oedema and infiltration under the epidermis and infiltrations around the blood vessels and sweat glands : these consist of plasma cells, lymphocytes, neutrophiles and eosinophiles.

In some cases, atrophy is more pronounced. Itching is common, but the condition is not disabling : it is, however, resistant to usual treatments but antibiotics (especially aureomycin) produce some temporary response.

No evidence of fungi or of irritants or friction could be found to account for the condition. It was commoner in males and formed 0·5 per cent. of skin lesions seen in Lagos. It is suggested that it may be a " new entity ". The alternative name of sycosis cruris is proposed. *H. J. O'D. Burke-Gaffney*

VOGEL, R. A. & CONANT, N. F. **The Cultivation of *Coccidioides immitis* in the Embryonated Hen's Egg.** *J. Bacteriology.* 1952, July, v. 64, No. 1, 83–6, 7 figs.

In another report [this *Bulletin*, 1952, v. 49, 798] the present authors referred to the method, described in this paper, of obtaining a rich suspension of the spherule form of *Coccidioides immitis*, for use as antigen in serological tests, by growing the fungus in the yolk sac of the developing chick embryo. The method consisted of inoculating a heavy spore suspension from 2-month-old cultures of *C. immitis* directly into the yolk sac of 8-to 9-day-old incubating eggs and continuing the incubation at 37°C. The yolk fluid was harvested, after varying periods of incubation, by aspiration with a 5 ml. syringe and a No. 18 needle. From a 17-day-old egg 4 to 5 ml. of yolk could be obtained. The yolk fluid was treated with 4 parts of a 10 per cent. solution of sodium chloride and stirred gently. After the egg protein had dissolved the mixture was centrifuged at 3,000 r.p.m. and the sedimented spherules collected. When examined microscopically, in the fresh state, the sediment was seen to consist of large, round, vacuolated, spherical objects resembling ordinary fat droplets. These were identified as fungal spherules by observing their behaviour in a Van Tieghem cell micro-culture in which they were seen to germinate. The spherules were also seen in all stages of development including the mature form filled with endospores. They measured from 10 to 40 μ in diameter.

The conversion from saprophytic spore to the spherule form took from 3 to 6 days at 37°C.

In subculture from egg to egg, a mycelial development was often observed but this form gave place to the spherule after a further period of incubation. All microscopical examinations were made on fresh, unstained material. The appearances are shown in 6 photomicrographs.

[NEWCOMER *et al.* (this *Bulletin*, 1952, v. 49, 995) conducted similar experiments but found it impossible to distinguish egg-yolk spherules from the spherule form of *C. immitis* when these were mixed together and examined microscopically in fixed and stained preparations. They obtained only a relatively poor growth of *C. immitis* in yolk-sac culture and this was, apparently, always in the mycelial form.] *J. T. Duncan*

FALKINBURG, L. W. **Disseminated Coccidioidomycosis. Report of a Case in the New England Area.** *J. Amer. Med. Ass.* 1952, Sept. 20, v. 150, No. 3, 216–17, 1 fig.

WIER, R. H., EGEBERG, R. O., LACK, A. R. & LEIBY, G. M. **A Clinical Trial of Prodigiosin in Disseminated Coccidioidomycosis.** *Amer. J. Med. Sci.* 1952, July, v. 224, No. 1, 70–76.

Prodigiosin (a purple tripyrrole methane dye extracted from cultures of *Bacillus prodigiosus*) was shown by one of the present authors (LACK, *Proc. Soc. Exper. Biol. & Med.*, 1949, v. 72, 656) to be fungistatic to *Coccidioides*

immitis in vitro. The dye, in non-toxic doses, was effective in the treatment of experimental coccidioidomycosis in small animals and it was afterwards found to be concentrated in the granulomatous lesions of the treated animals.

The present report gives details of 9 patients with coccidioidomycosis treated in the disseminated stage, 6 of the patients being Negroes, a race in which the prognosis for recovery is bad.

The drug was administered by the following four methods : (*a*) By direct injection into the accessible lesions, which caused a local inflammatory reaction followed by a reduction in the number of viable fungal cells so that cultivation from the lesion was no longer possible. Within its limitations, this appeared to be an effective method of treatment. (*b*) By intramuscular injection ; used to achieve a more general effect. As the dye is insoluble in water it was necessary to make a water-soluble compound by adding glutamic acid to one of its pyrrole rings. This preparation, injected in a severe case in doses commencing with 1·0 mgm. and increasing to 25 mgm. daily, gave promising results, but the difficulty of obtaining a sufficient amount of the soluble compound caused the treatment to be abandoned. (*c*) By intravenous injection. For this purpose the dye was dissolved in propylene glycol, but difficulty was caused by the tendency to form a precipitate when mixed with procaine solution, isotonic saline, Ringer's sodium lactate solution, protein hydrolysates or blood serum. It was necessary to administer the drug very slowly in order to avoid provoking attacks of dizziness, and in the later work it was given in a running venoclysis of 5 per cent. glucose in water. In all cases it caused local thrombophlebitis so that prolonged courses of treatment by this method were precluded. Nevertheless, in doses increasing up to 25 mgm. daily, intravenous medication was used in all cases until venous sclerosis left no further path available. In one case a total dosage of only 75 mgm. was followed by apparent recovery but in another 475 mgm. proved ineffective. (*d*) Oral administration was used in 2 cases (in addition to other procedures) in doses of 10 mgm. *t.i.d.* to a total dosage of 3·5 and 4·2 gm. respectively. In one case there was clinical improvement but in the other no observed effect. With this method of administration it was not found possible to determine blood drug levels but as the amount passed in the faeces was less than that administered by mouth it can be assumed that some absorption took place.

Three of the 9 patients included in the report achieved apparent recovery but 4 died, one after a transient clinical improvement. Therapeutic evaluation of prodigiosin is not possible from the ultimate results of treatment of such a small group of cases of a disease which has a mortality rate of 60 per cent. or less, but the early clinical and immunological responses to the treatment were encouraging and justify a continuation of the investigation. [It is stated that there were 14 patients treated, but 5 "were moribund when therapy was instituted". Some of these 5 appear to be included in the 9 described above.]

J. T. Duncan

TROPICAL OPHTHALMOLOGY

South Pacific Commission, Noumea, New Caledonia. **Project H.6 : Ophthalmology. Trachoma in Fiji** (Swanston, C.). *Technical Information Circular No. 1* (Issued by Health Section). 1952, July, 14 mimeographed pp.

The population of Fiji in the 1944 census was 246,485. This comprised Fijians 113,179 ; Indians 113,147 ; Europeans and half-castes 5,254 ; Chinese, Polynesians and other residents in the islands made up the remainder.

In 1945 an investigation into the prevalence of trachoma in Fiji was carried out by the author. He came to the following conclusions : that trachoma existed in Fiji ; that between 30 and 35 per cent. of the Fijian population from early childhood up to the age of 30 and over 80 per cent. of the elderly Fijians were infected. The disease was not as prevalent as it was earlier in the century but the incidence now appeared to be static and further measures were necessary to reduce it. The disease existed among the Indian population but not to the same extent as among the Fijians. Probably about 10 per cent. to 12 per cent. of Indians were infected. Among the Chinese, full-blooded Chinese who lived in Fijian villages were more likely to suffer from trachoma than those who lived separately. Part-Fijian Chinese were also subject to the disease. Trachoma existed among the half-caste Fijian Europeans, though not nearly to such an extent as among the pure Fijian population. It was non-existent among white troops stationed in Fiji and rare, if present at all, among European residents. The main reason for the prevalence of trachoma was the conditions under which native Fijians lived, and their personal habits. The disease was nearly always contracted in childhood either from other children or from the old people who frequently play with and fondle the children. The report ends with a number of recommendations for control of the disease.

The incidence of trachoma in terms of ages and provincial distribution is shown in 3 tables. *E. O'G. Kirwan*

J. Amer. Med. Ass. 1952, Aug. 30, v. 149, No. 18, 1667. **Terramycin Therapy in Trachoma.** [Foreign Letters—Reference to paper by I. Bilger.]

The effectiveness of terramycin on 700 patients in the Adana Trachoma Hospital, in Turkey, suffering from trachoma is discussed by Bilger in *Eye Clinic*, an Istanbul periodical. The terramycin was administered by the mouth, 250 mgm. in capsules, 0·1 per cent. and 0·5 per cent. ointment and 0·5 per cent. lotion. Of 38 patients with acute trachoma 27 recovered after 3–6 weeks and 11 after 5–10 days. Patients with chronic trachoma needed 2–3 months' therapy for complete recovery. Of 640 children suffering from chronic trachoma in a special school, 20 per cent. recovered after terramycin therapy alone or with other treatment, for 2–6 weeks. After 12 weeks, 80 per cent. recovered. Terramycin was well tolerated by all the patients. *E. O'G. Kirwan*

Baird, D. A. **A Case of Optic Neuritis in a Qat Addict.** *East African Med. J.* 1952, Aug., v. 29, No. 8, 325–6.

Qat or *Khat* is *Catha edulis*, the Arabian Tea Plant.

See also p. 65, Wilder, **Toxoplasma Chorioretinitis in Adults. A Preliminary Study of Forty-One Cases diagnosed by Microscopic Examination.**

PROTOZOOLOGY : GENERAL

Lelong, M. & Desmonts, G. Sur la nature du phénomène de Sabin et Feldman. [**The Nature of Sabin-Feldman's Dye Test**] *C.R. Soc. Biol.* 1952, Feb., v. 146, Nos. 3/4, 207–9.

A comparison is made between Sabin and Feldman's test for toxoplasmosis and other serological reactions, with the view to elucidating the nature of the dye test. The authors have previously [this *Bulletin*, 1952, v. 49, 905] shown that the cytological changes induced in toxoplasms by immune serum

can be readily observed with the aid of phase microscopy. Since these alterations bear a strong resemblance to haemolysis, a study was made of the effect of saline concentration on the structure of the parasites. It was found that in hypertonic solutions the parasite contracts, while its refraction and optic density increase. In hypotonic solutions the changes are comparable to those produced in the parasite by immune sera, *viz.*, its body becomes turgid and its cytoplasm granular. Similar results are produced by freezing, the haemolytic effect of which is well known. Since both in hypotonic solutions and after freezing, the toxoplasms do not stain any more with alkaline methylene blue, and since their behaviour in this and in other respects is similar to that of lysed bacteria, which lose their affinity for dyes and become less refractile, the authors conclude that the Sabin-Feldman reaction is a manifestation of incomplete toxoplasmolysis. The similarity of the dye test and Pfeiffer's phenomenon is also evident from the fact that various strains of *Toxoplasma* differ in their response to immune sera ; moreover, as in the case of haemolysins, the antibodies in the dye test are thermostable, active in high dilutions, readily preserved in the refrigerator, and react in the presence of fresh serum, the " accessory factor " of which is comparable to complement. *C. A. Hoare*

Wilder, Helenor C. **Toxoplasma Chorioretinitis in Adults. A Preliminary Study of Forty-One Cases diagnosed by Microscopic Examination.** *Arch. Ophthalmology.* 1952, Apr., v. 47, No. 4, 425.

The author, in Washington, D.C., found organisms morphologically corresponding to *Toxoplasma* in unilateral chorioretinal lesions of 41 eyes removed from patients aged 16 to 72. Twenty-seven patients were males : one was a Negro. In 7 cases conditions apart from the eye were recorded, *viz.*, recent childbirth ; rheumatoid arthritis ; diabetes ; previous severe tonsil and tooth infection ; previous gall bladder and cardiac lesions ; sore throat ; and, in one case, an inguinal gland lesion histologically similar to that in the eye.

The other 34 patients apparently were free from symptoms apart from the eye, though 9 gave histories of direct injury at varying intervals before the onset of ocular manifestations. The eye symptoms had been present for 1 month to 32 years.

The lesions were strikingly uniform, and their granulomatous and necrotic character had in many cases raised the question of tuberculosis. The organisms, some appearing in pseudocysts, were identified in paraffin sections, but the characteristic crescentic forms were best demonstrated in celloidin sections.

Continued study is expected to reveal several more cases. An attempt is being made to correlate serological and pathological findings. A fuller report is in preparation. *H. J. O'D. Burke-Gaffney*

Giroud, P., Le Gac, P. & Gaillard, J. A. Mise en évidence de toxoplasmes sur souris inoculées avec des broyats de *Thrombicula le gaci*—Marc André 1950—recueillis sur *Lemniscomys barbarus striatus* et sur *Mylomys cuninghamei alberti* capturés en Oubangui-Chari. [**Identification of Toxoplasms in Mice Inoculated with Pools of** *Trombicula legaci* **collected from a** *Lemniscomys barbarus striatus* **and** *Mylomys cunninghamei alberti* **captured in Oubangui-Chari**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 449–51.

The following is a translation of the authors' summary :—

Experimental evidence is given of the presence of toxoplasms in *Trombicula* taken from the ears of rodents belonging to the commonest species in Oubangui, namely, the striped rat, *Lemniscomys barbarus striatus* (which, curiously, is

banned as food by the forest witch-doctors) and the green rat *Mylomys cunninghamei alberti*, which is the favourite dish of the Oubangui plainsmen.

H. J. O'D. Burke-Gaffney

ENTOMOLOGY AND INSECTICIDES: GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

RAHMAN ANSARI, M. A. & SHAH, K. S. **A Guide to the Mosquitoes of the Punjab.** pp. iv+45, 6 pls., 1 chart & 1 map. [15 refs.] 1951. Punjab: Directorate of Health Services. [Rs. 1-12-0.]

This "guide" is concerned with anopheline mosquitoes only. It is in simple English and makes a handy booklet for local Malaria Inspectors and Entomological Assistants for use in the field or laboratory. It is not original or exhaustive but presents the facts in practical form, beginning with classification and moving through all stages to identification of species. The columnar keys and the illustrations (though merely sketches) draw attention to the essential differences.

There are also notes on bionomics, collecting, mounting and forwarding. Unfortunately, there are many misprints, some of which might confuse the beginner.

H. S. Leeson

SMITH-WHITE, S. **A Note on Non-Reciprocal Fertility in Matings between Subspecies of Mosquitoes.** *Proc. Linnean Soc. of New South Wales.* 1950, v. 75, Pts. 5/6, 279–81.

HASSETT, C. C. & JENKINS, D. W. **The Uptake and Effect of Radiophosphorus in Mosquitoes.** *Physiol. Zool.* 1951, v. 24, No. 3, 257–66, 5 graphs.

ROUBAUD, E. Fécondation et reproduction en insectarium du culicide eurygame *Theobaldia annulata* Schr. [**Fertilization and Reproduction in the Insectarium of** *Theobaldia annulata*] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 469–72.

TREMBLEY, Helen L. **The Distribution of certain Liquids in the Esophageal Diverticula and Stomach of Mosquitoes.** *Amer. J. Trop. Med. & Hyg.* 1952, July, v. 1, No. 4, 693–710, 1 fig. [36 refs.]

Quantitative data were collected concerning the distribution of ingested liquids in the midgut and diverticula of *Aëdes aegypti* and *Anopheles quadrimaculatus* and the work was extended to some other mosquitoes. The foods tried were blood, honey, glucose, mixtures of blood and glucose and mixtures of blood and honey.

Blood was obtained by the mosquitoes in biting man, by feeding on heparinized chicken blood through membranes or from moistened cellucotton. Glucose and honey were offered through membranes or on cellucotton.

Of those fed on blood, some were allowed to feed continuously until satiated, others with interruptions until satiated and others continuously until partially fed. Observations were made immediately, 2 hours and 24 hours after the mosquitoes had fed. Both *A. quadrimaculatus* and *Aëdes aegypti* refused to feed when their abdomens were distended with eggs; they both fed again after oviposition.

Blood, however taken, was dispatched primarily but not exclusively, to the stomach. In *A. quadrimaculatus, A. freeborni, A. albimanus, A. aztecus, Aëdes atropalpus* and *Culex pipiens* blood went to the stomach and to the diverticula ; but in *Aëdes aegypti, Aëdes albopictus* and *Aëdes vexans* blood went with a few exceptions to the stomach only. The proportion of mosquitoes showing blood in the diverticula appeared to be a distinguishing characteristic of the species and ranged from less than 11 per cent. in *Aëdes albopictus* to over 70 per cent. in *Anopheles quadrimaculatus*. Interrupted feeding did not cause diversion of the blood to the diverticula. In *C. pipiens* there was a trend towards the dispatch of blood to the crop ahead of the dorsal diverticula but in all other species blood was distributed at random.

Sugary solutions went primarily, though not exclusively to the diverticula in all species. Mixtures of whole blood and honey and of whole blood and glucose solutions were taken through a membrane by *Aëdes aegypti* as readily as whole blood and the mixtures passed primarily to the stomach.

Whether one or all of the diverticula aid in the digestion of blood and sugar solutions, or whether they function merely as storage organs is not yet determined.

H. S. Leeson

MATTINGLY, P. F. **The Sub-Genus *Stegomyia* (Diptera, Culicidae) in the Ethiopian Region. I. A Preliminary Study of the Distribution of Species occurring in the West African Sub-Region with Notes on Taxonomy and Bionomics.** *Bull. Brit. Mus.* (*Nat. Hist.*) Entom. Ser. 1952, v. 2, No. 5, 235–304, 16 figs. [Numerous refs.]

The author describes the objects of this study as : " firstly to render possible a more rational approach to the taxonomy of the sub-genus *Stegomyia*, and incidentally of other African insects, and secondly to discover what light may be thrown by this comparatively well-known group on general problems concerning the distribution of the Ethiopian fauna ". This paper is the first of a series and deals only with the distribution of the species of *Stegomyia* which have been found in the West African sub-region.

Some notes are given on taxonomy, full treatment of the subject being reserved for a later paper. Newly compiled keys are provided for the identification of the adults and fourth-stage larvae of more than 30 species. Distribution records are given for the 11 species which are considered in this paper : *Aëdes* (*Stegomyia*) *aegypti, africanus, apicoargenteus, dendrophilus, fraseri, luteocephalus, metallicus, pseudoafricanus, simpsoni, unilineatus* and *vittatus*. *Aëdes aegypti* is treated very briefly as it is regarded as a special case meriting a separate paper. Only one species, *apicoargenteus*, occupies the whole or a large part of the sub-region and normally extends for only short distances beyond its boundaries but a note in the appendix announces a recent find at Ukara Island, Tanganyika. The other species occur in other parts of Africa ; one of them, however, *metallicus*, is recorded from only four localities in the sub-region ; two of the remainder, *unilineatus* and *vittatus*, occur also in other parts of the world.

The major factors affecting the distribution of these mosquitoes seem to be rainfall, temperature, altitude, humidity and vegetation. The present discussion is mainly in relation to rainfall and altitude and the evidence suggests that rainfall operates indirectly through its influence on vegetation. Consideration of the other factors has been postponed to later papers. There are brief comments on seasonal distribution, in our knowledge of which there are serious gaps, on breeding places and on biting habits.

Records are available from rather more than 500 different localities. Much labour has been expended in mapping and listing these localities together with

their altitudes, longitudes, latitudes and rainfalls with the intention of saving future students of this subject a great deal of time.

The readers of this paper will be looking forward eagerly to the next in the series. *H. S. Leeson*

VERMEIL, C. Contribution à l'étude d'un biotype tunisien du moustique commun, *Culex pipiens* L. [**Study of a Tunisian Biotype of the Common Mosquito,** *Culex pipiens*] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 546–54, 4 graphs.

Studies have been made upon material of *Culex pipiens* found in a flooded cellar in Tunis, and also upon larvae and pupae found at El-Menzah, suburb of Tunis. Adults hatched out were put into cages (30×30×30 cm.) and from them two stocks, Storia and El-Menzah respectively, were raised and maintained.

The percentage of autogenous [*i.e.*, those mosquitoes which oviposit without a blood meal] individuals was established and found to average, in both cases, about 70 per cent. Ovarioles of the Storia collection recalled those which had been observed in autogenous forms in France.

Larval characters were used in studying the morphology of the stock, similar figures being selected to those which are used in identifying European biotypes of *Culex pipiens* in accordance with the work of Marshall and Callot. The author studied the siphonal index and the average numbers of bristles of the siphonal tufts of 4th-instar larvae ; he gives the average measurements, also the measurements of the specimens showing the most and the least marked characteristics of autogeny. Comparative graphs illustrate the range of variation in numbers of chaetae in the siphonal tufts and in the numbers of teeth of the mentum, between the two stocks maintained by the author and *Culex autogenicus* (Callot) of Strasbourg and *Culex pipiens* (Callot) of Richelieu.

Certain peculiarities in the behaviour of the females of the El-Menzah stock after blood meals are mentioned, and it is shown that about 30 per cent. of the females in this experiment could produce egg rafts without fertilization having taken place—the egg rafts were always sterile.

The conclusion is that besides *Culex pipiens berbericus*, already known in Algiers and Tunis, there exists a city biotype of *Culex pipiens* whose morphological and biological characteristics indicate it to be *Culex autogenicus* Roubaud. *Anne Hudson*

HOCKING, B. **Protection from Northern Biting Flies.** *Mosquito News.* 1952, June, v. 12, No. 2, 91–102. [73 refs.]

The problem of nuisance from the bites of mosquitoes and other insects in the northern parts both of the Old and New World is much more serious than most people realize. The author points out that as an extreme figure 280 mosquito bites on one forearm have been recorded in one minute in northern Canada. If the man had been completely naked (and if the mosquito population had sufficed) he would have received over 9,000 bites per minute, which may be reckoned as the equivalent of about 23 grams of blood. At that rate the man would lose half his blood in $1\frac{3}{4}$ hours and one may assume that that would prove fatal. In addition to this there might be serious reactions, particularly to bites of *Simulium* and also the possibility of transmission of infection, particularly of encephalitis. The psychological effects, though difficult to measure objectively, are evidently very great.

It is evident that the author has first-hand knowledge of the problem. In the present paper he summarizes what is known and gives references to a large number of articles, most of them published within the last 5 years. It would not be an easy matter to make an abstract of the paper, which gives attention first to the factors which attract the biting insect to the mammal and then discusses the information available. It then passes on to the " external protective devices ", for instance, the use of smoke, repellents, protective clothing and the fly-proofing of buildings. The " internal protective procedures " are at the moment less developed ; they include such things as the possibility of immunizing man or beast against the insect bites and the possibility of taking some substance by the mouth which would have a repellent effect. Furthermore, the annoyance and irritation of the bites may to some extent be reduced by training people in ways of reducing the trouble and by a psychological approach which might contribute to morale.

The paper is to be recommended as giving an up-to-date summary of a subject not sufficiently understood in many parts of the world.

P. A. Buxton

FISHER, R. W. **The Importance of the Locus of Application on the Effectiveness of DDT for the House Fly,** *Musca domestica* **L. (Diptera : Muscidae).** *Canadian J. Zool.* 1952, Aug., v. 30, No. 4, 254–66, 5 figs. (3 on pl.) [15 refs.]

It has been generally assumed that the tarsal segments and the pulvilli of flies are highly effective areas for the sorption of DDT. This study is concerned with the mortality rates produced by the application of uniform dosages of DDT to various areas on the cuticle of the house-fly. Large differences in these rates were observed and were shown to be dependent on the locus of application of the insecticide and the size of the area. The apparatus used and the rearing and experimental techniques are fully described and illustrated.

DDT-benzene droplets were produced by a syringe combined with a microfine glass tube and a rocking microtome. The droplets were evaporated on water and applied (either as saturated droplets or as crystalline masses) to 16 different areas of the integument of male *Musca domestica* immobilized in holders made of cellulose tape to prevent them transferring the DDT to other parts of the body.

DDT in benzene was more effective than crystalline DDT. Crystalline DDT applied to the pulvilli was ineffective. Mortality resulted only when the flies were permitted to scratch, with the pulvillus and tarsal segments of one leg, a strip of tape covered with fine crystals of DDT. Forty flies were treated in this way and 100 per cent. mortality occurred in 24 hours. A large dose of crystalline DDT inserted into the tissues of the mesonotum had no effect, but one-third of this dose applied externally on the mesonotum as a saturated solution produced a high mortality.

The effectiveness of DDT in benzene applied externally increased as the loci of application approached the body or head. Other body areas were more effective loci than the pulvilli. The labella were particularly sensitive to DDT and flies treated here were not only knocked down sooner than those treated on the tibiofemoral membrane but they immediately made cleaning movements whereas those treated on the tibiofemoral membrane did not commence cleaning movements for several minutes.

Areas of different sizes were made by cutting squares in the cuticle of the mesonotum to isolate patches from the remainder of the integument. Coagulated haemolymph held the squares in place. After placing the DDT on these isolated squares it was noted that mortalities were progressively lower as the

area available to the DDT was progressively decreased from the intact integument in the controls to the large squares then to the small squares.

There is no evidence that cuticle thickness played any part in either preventing or retarding DDT penetration and a statistical analysis of mortalities obtained in another experiment showed that excess of cuticular waxes neither increased nor decreased the effectiveness of the DDT.

The results of these experiments seem to lead to the concept of the fly cuticle as a tissue actively involved in the insecticidal action of DDT. It is suggested that, in nature, the DDT accumulated on the tarsi and pulvilli is distributed to the other more susceptible areas of the integument by the cleaning movements of the flies. *H. S. Leeson*

OLDROYD, H. **A New *Chrysops* (Diptera, Tabanidae) from the British Cameroons.** *Ann. Trop. Med. & Parasit.* 1952, Sept., v. 46, No. 2, 155–7, 2 figs.

TALICE, R. V. & GONZÁLEZ-CIAPESSONI, A. Nuevos casos de miasis forunculosa humana en la región atlántica uruguaya. [**Fresh Cases of Pustular Myiasis in Man on the Atlantic Borders of Uruguay**] *Archivos Uruguayos de Med., Cirug. y Especialidades.* 1952, Apr., v. 40, No. 4, 257–68, 6 figs. [10 refs.] English summary.

Pustular myiasis has been observed for many years in districts to the north of Rio Negro and in the Department of Cerro-Largo, but of late years the zone of involvement has extended to the south-east and as far as the Atlantic coast of the Departments of Rocha and Maldonado [see this *Bulletin*, 1951, v. 48, 1156]. Similar extension has been noticed in the State of Rio Grande del Sur. The authors give a list of 24 autochthonous cases recorded between 1926 and 1940, apart from references to other, imported, cases during the same period.

Brief details are given of 5 human patients and a dog with myiasis due to *Dermatobia hominis*. Altogether, 10 persons and the dog were exposed to infection during a stay of 5 days in or about Fortaleza de Santa Teresa. Among the 5 human beings infected there were 13 lesions : 4 over the right scapula, 4 on the gluteal region, one on each thigh, one on the left pectoral region, one on the right tibia and one on the dorsum of the right foot. Doubtless other cases occur, especially during the hot season, but are not seen by medical men or are not recorded. Clearly the distribution of infection is extending and it is becoming endemic on the Atlantic coastal districts of Uruguay.

H. Harold Scott

KETTLE, D. S. & LAWSON, J. W. H. **The Early Stages of British Biting Midges *Culicoides* Latreille (Diptera : Ceratopogonidae) and Allied Genera.** *Bull. Entom. Res.* 1952, Oct., v. 43, Pt. 3, 421–67, 123 figs. & 6 pls. [20 refs.]

HUTTEL, W. & HUTTEL, Nancy. Un cératopogonide nouveau du Soudan français vulnérant pour l'homme (Dipt. *Heleidae*). [**A New Ceratopogonid of the French Sudan Harmful to Man**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 472–4, 1 fig.

NICOLI, R. M. Phlébotomes de la Corse : biologie du *Phlebotomus perniciosus legeri* (J. Mansion, 1913). [**Phlebotomus of Corsica : Biology of *P. perniciosus legeri***] *C.R. Soc. Biol.* 1952, Apr., v. 146, Nos. 7/8, 578–80.

MARLIER, G. **Fish Feeding on Simulium Larvae.** [Correspondence.] *Nature.* 1952, Sept. 20, v. 170, 496.

In the Lake Tanganyika region, the author found a migrating fish, ***Varicorhinus tanganicae*** which fed on algae, diatoms and insect larvae on stones

and the bottom of streams. *Simulium* larvae were apparently principal items of its food : for example, of 120 fish, over half contained *Simulium* larvae or pupae : nearly half contained Chironomids and many other insects. In some stomachs, *Simulium* larvae numbered over 50.

The mouth parts of *Varicorhinus* are well adapted to scraping stones and weeds : the fish spends part of its life in the Lake and part in affluent streams, with varying mineral content. It can ascend very rapid streams against strong currents, and withstand considerable variations of temperature and electric conductivity. It is thus very adaptable to external conditions.

As *Simulium* larvae are very common in rapid streams in East and Central Africa, it is suggested that *V. tanganicae* or other species of this genus from rivers, could be introduced into regions where *Simulium* [and presumably Chironomids] are pests. [The suggestion has also obvious possibilities in the control of onchocerciasis and of conditions associated with Chironomids.]

H. J. O'D. Burke-Gaffney

Collins, D. L., Travis, B. V. & Jamnback, H. **The Application of Larvicide by Airplane for Control of Blackflies** (*Simuliidae*). *Mosquito News.* 1952, June, v. 12, No. 2, 75–7.

Data are given showing the reduction in numbers of black fly larvae (Simuliidae) in streams in Herkimer County, New York, U.S.A., sprayed by DDT from aircraft in 1951. The dosages were at the rate of 0·017 lb. (1st spray) and partially at 0·1 lb. (2nd spray) per swath-acre.

Even the lighter dosage reduced the larval population by 72 per cent. After the supplementary treatment the populations in all but 3 streams were reduced virtually to zero. Two were small streams and may have been missed, or protected by overhanging vegetation ; in the third, the surviving larvae were nearly ready to pupate.

Five-minute sampling every half-hour showed that the lighter dosage achieved its maximum effect in the comparatively short time of 1½ hours. No serious reduction in the populations of other Arthropods resulted from these treatments.

Annoying adult blackflies were rare in the control area in 1951 but it must be remarked that in the marginal areas control was sometimes relatively poor.

H. S. Leeson

Kitaoka, M. **DDT-Resistant Louse in Tokyo.** *Japanese J. Med. Sci. & Biol.* 1952, Apr., v. 5, No. 2, 75–88, 5 figs.

In 1948 complaints were received from one particular underground shelter in Tokyo that dusting tramps with DDT was not giving a satisfactory destruction of lice. A partial explanation of the failure was that some of the powders used, which were packed in paper not in metal containers, had become moist so that they tended to be lumpy and therefore less effective. Apart, however, from that, the author's figures appear to show that when a particular dose of powder is tested on a certain area of blanket and lice put upon it the insects tended to live longer in 1951 than they did in 1948. It seems also that after breeding the insects for 7 or 8 generations in contact with small quantities of DDT a slightly increased resistance has been produced. [The increase is not very great and it may be doubted whether the dusting technique is sufficiently critical to allow one to be certain that so small a difference exists.]

P. A. Buxton

Le Gac, P. Présence de *Thrombicula sicei*, Marc André 1950, sur les oiseaux piéteurs de l'Oubangui-Chari : *Gallus domesticus*, *Numida meleagris* et *Ptilopachus petrosus*. [**Presence of** *Trombicula sicei* **on** *Gallus domesticus*, *Numida meleagris* **and** *Ptilopachus petrosus* **in Oubangui-Chari**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 477–9.

Sudd, J. H. **Laboratory Studies of Adult Female** *Bdellonyssus bacoti* **(Hirst, 1916) (Acarina, Parasitiformes).** *Ann. Trop. Med. & Parasit.* 1952, Sept., v. 46, No. 2, 158–64, 4 figs. [14 refs.]

Andrews, J. M. **Household Insecticides—their Role in Public Health.** *Soap.* New York. 1952, Sept., v. 28, No. 9, 135–8, 167. [32 refs.]

LABORATORY PROCEDURES

Ghosh, S. K. & Das Gupta, C. R. **Leishman Stain made with Ethyl Alcohol.** *Indian Med. Gaz.* 1952, July, v. 87, No. 7, 302–3, 1 coloured fig. on pl.

Because of difficulty in obtaining methyl alcohol, the authors, in Calcutta, made experiments to find whether a suitable haematological stain could be prepared by dissolving dry Leishman stain in ethyl alcohol.

They obtained a satisfactory stain for all blood cells and for malaria parasites by dissolving 0·15 gm. of good quality Leishman stain in a solvent consisting of neutral and anhydrous glycerol, 10 ml. ; water, 10 ml. ; and absolute ethyl alcohol to 100 ml. The stain is prepared in the same way as that in which methyl alcohol is used.

After a film is fixed with this solution for 3 minutes in the ordinary way, an equal volume of buffer solution is added to the quantity of stain covering the film : the buffer solution consists of anhydrous disodium phosphate, 4·5 gm. ; anhydrous monopotassium phosphate, 2·5 gm. ; and distilled water to 1,000 ml. After adequate mixture, the diluted stain is left for 12 minutes, the film is flooded with tap water, transferred to fresh distilled water until faintly pink, washed with tap water and dried.

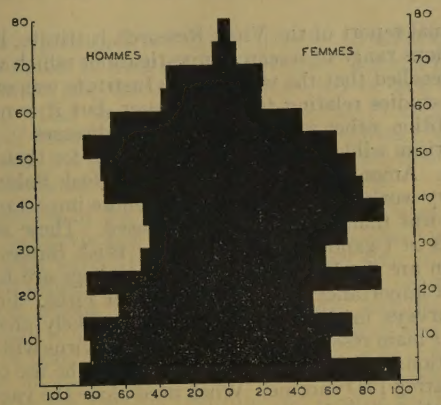
The appearance of a blood film showing malaria parasites and stained in this way is shown on a coloured plate. Work is in progress toward shortening the period of staining. *H. J. O'D. Burke-Gaffney*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

Bouckaert, J. P. & Reul, R. Contribution à l'étude de la population du district de la Tshuapa. [**A Population Study in Tshuapa District, Belgian Congo**] *Inst. Roy. Colonial Belge. Sect. des Sci. Naturelles et Méd. Mémoires.* (Collection in —8°.) 1952, v. 21, No. 3, 47 pp., 5 figs.

This 48-page memorandum of a demographic study of a district in the Belgian Congo is a valuable contribution to knowledge of populations in Africa. The district of Tshuapa in 1947 had a population of 681,448 as compared to 730,475 in 1937. The basis of the study was split between 3 areas considered to be representative of the whole district and containing the following populations in 1947 : Boende 69,471, Befale 44,125, Djolu 59,534. The gathering of information from peoples of low educational level is fraught with difficulties.

The following population pyramid on the interrogation of 1,824 persons is believed to be a fair sample of the population of these three areas.



Age pyramid of a sample of the population of the Tshuapa district, Belgian Congo.

[The abscissae give the numbers for each age-group, and the ordinates the years of age.]

[Reproduced from *Mém. Inst. Royal Colonial Belge, Sci. Nat.*, (8vo.). 1952, v. 21, No. 3.]

It is evident from the pyramid that the proportion of people above the age of 35 is abnormally high. At first sight causes may be :—

(*a*) low birth rate for a period of years about 40 years ago ;
(*b*) considerable infant mortality during the last 40 years ;
(*c*) emigration of the younger elements of the population.

Average birth rates for the 5-year period 1943/48 are as follows : Boende—29·51, Befale—18·27, Djolu—38·38, total—28·76, Befale having a low birth rate, Boende average and Djolu fairly good. The total is average. The population of Befale has decreased by 20·3 per cent., Boende by 2·5 per cent. and Djolu by 1·2 per cent. for the last 10 years. In consequence, it is suggested that the low birth rate is the basic cause of the falling population.

Specific birth rates of each area for the 5-year age-groups of the childbearing period (15–55) are tabulated : 582 women of the childbearing age had 262 children in 5 years, giving a specific birth rate of 90·14. This specific birth rate exceeds that for European women in Belgium. The authors discuss further the comparison of the fertility of these two races in relation to the normal fertility rate defined by PEARL (1939), *The Natural History of Population*, Oxford and London.

In investigating mortality, the sample consisted of 449 women totalling 1,093 children of whom 396 had died. In the analysis of these figures it was observed that the numbers of deaths in children under 5 years was similar to those occurring in India.

The net reproduction rates for the 5-year period 1943/48 for the three areas are as follows : Boende—0·887, Befale—0·532, Djolu—1·007, the average for all being 0·82.

The birth rates quoted above are therefore a good indication of the population prospect : Befale will continue to fall, Djolu is static and Boende might become static if the death rate were lowered. *R. Ford Tredre*

East Africa High Commission. **Virus Research Institute Annual Report 1951** [Horgan, E. S., Director]. 23 pp. [24 refs.] 1952. Nairobi: Govt. Printer.

The second annual report of the Virus Research Institute, Entebbe, Uganda, describes a prodigious range of research investigations which were made during 1951. It will be recalled that the work of the Institute was originally confined almost wholly to studies relating to yellow fever, but it is now the policy to investigate, in addition, other virus and rickettsial diseases.

A number of African wild animals have been tested for their susceptibility to yellow fever virus. Among the susceptible species Bush Babies might prove of value for laboratory work, and they may play a more important rôle as natural reservoirs of the virus than was formerly supposed. These surveys in Kenya and the drier parts of Uganda indicate that the Bush Babies are more likely to be infected than are the local monkeys. Hedgehogs are highly susceptible and may also be of importance in the ecology of the virus. From the evidence of comparative surveys in different districts it is likely that the particular species acting as the main reservoir of the yellow fever virus will depend upon the precise local conditions. Further work is reported on the use of scarification as a method of inoculating 17D vaccine. When used alone the vaccine given in this way proved very satisfactory but it was not advisable to combine it with smallpox vaccine. The smallpox vaccination was unaffected but the response to the 17D vaccine was definitely inferior in a small series. Further work is reported on Zika virus, Uganda S and Mengo encephalitis virus. The last-named virus is probably transmitted to man from rats but mosquitoes do not seem to be important vectors.

Small pools of human sera were collected from isolated areas in Uganda and were sent to the United States for assay of neutralizing antibodies for poliomyelitis virus. It is an important finding that the sera contained neutralizing antibodies for all three main serological types of poliomyelitis virus and it is probably safe to infer that strains of Brunhilde, Lansing and Leon types all exist in this part of Africa. Attempts were made to isolate rickettsiae from two cases suspected to be tick typhus, but no success was obtained. Five hundred and sixty human sera were tested with a number of rickettsial antigens including Rocky Mountain Spotted Fever or rickettsialpox as group antigens for tick typhus, murine as a group antigen for murine and epidemic typhus, and Q fever. Thirteen of the sera gave positive reactions with the antigens of the tick typhus group.

The reviewer is not competent to consider the sections on Entomology; perhaps the time has now come for the work of this and previous years to be reviewed so that the virus worker could grasp the significance of the wealth of detailed information now available on insect vectors. The report ends with a list of 24 papers prepared during the year for publication. *Forrest Fulton*

Documenta Med. Geograph. et Trop. Amsterdam. 1952, June, v. 4, No. 2, 179–91. **Dutch Contributions to the Progress of Medical Science in the Tropics, 1900–1950. Introduction** [Winckel, C. W. F. (179–80)]; **I. Tropical Medicine** [Kouwenaar, W. (180–84)]; **II. Tropical Hygiene** [Dinger, J. E. (185–7)]; **III. Sanitary Organization** [van Loghem, J. J., Sr. (187–91)].

The *Nederlandsch Tijdschrift voor Geneeskunde* (Netherlands Medical Journal) has published a series of papers on the Dutch contributions to medical science during the last 50 years, among which were three on tropical medicine. These

have now been translated into English. The researches mentioned have nearly all been reported in other Dutch journals, and largely abstracted in this *Bulletin*.

The *Documenta* is published in English, in order to make known the achievements of its contributors to their colleagues abroad, because formerly they were all reported in Dutch and this had sometimes led to lack of appreciation in foreign countries. This was demonstrated in the Proceedings of the First Industrial Tropical Health Conference in Boston (Mass.) in December 1950, in which " Indonesia and its public health are given less than two pages ", and, it is said, some misstatements and omissions were made.

1. At the beginning of the twentieth century there were a number of first-rate clinicians in Indonesia who applied modern advances in medicine to diseases in the tropics : such were Kiewiet DE JONGE, VAN DER SCHEER, SCHÜFFNER, KUENEN, LIM and others. There were two prominent centres : the one comprised the medical school, the Eijkman Institute, and the Military Hospital and Laboratory—all in Djakarta (Batavia) : the other was a group of Estate doctors working in plantation hospitals and laboratories in the plantation area on the East Coast of Sumatra. In later years a medical school was founded in Surabaya as well as the Pasteur Institute and Cancer Institute in Bandoeng. Unique in the tropics are VAN DIEL'S statistics on the causes of death among 300,000 estate labourers on the East Coast of Sumatra.

An imposing number of achievements is listed. These include the well-known work of Schüffner on malaria, hookworm and typhus : that of van der Scheer on dengue, malaria and sprue ; of LAMPE and BOENJAMIN on leprosy ; of BRUG and LICHTENSTEIN on filariasis : of Kiewiet de Jonge on tropical physiology and pathology : of VAN STEENIS on haematology ; and a host of others.

II. The theory that only a small number of species and varieties of *Anopheles* need controlling as potential vectors of malaria crystallized in the idea of " species sanitation " to which SWELLENGREBEL subscribed. Schüffner and Swellengrebel were among the pioneers of malaria and other research in the tropics and their manual remained a guide for many years.

Parasitic worms in Indonesia were studied by BRUG, BONNE and LIE KIAN JOE.

In cholera research VAN LOGHEM, GISPEN, TAMANAL and DE MOOR did pioneer work. OTTEN, VAN LOGHEM, DE VOGEL and FLU made notable contributions to the control of plague. EIJKMAN and GRIJNS it is claimed should be considered " as the founders of vitamin science " and JANSEN and DONATH isolated crystalline vitamin B1, purified later by VAN VEEN. Many workers, notably Schüffner, contributed to research on leptospirosis, typhus and yellow fever. The Institute of Nutritional Research founded in 1934 has conducted extensive investigations into the dietetic customs of the population.

III. In the Netherlands East Indies the principal work on community sanitation was the plantation hygiene on the East Coast of Sumatra, which proved to be a very important step in lowering the death rate among plantation workers. The poorly equipped small plantation hospitals were replaced by central hospitals. These centres soon developed into organizations for prevention as well as cure.

A central scientific institution was established in 1906 on the East Coast of Sumatra at Medan.

Schüffner is recognized as the pioneer and leader of what is called an " unparalleled social-medical feat ".

The reorganization of public health in the natural communities of the Netherlands Indies was epitomized in *Geneeskundig Tijdschrift voor Nederlandsch-Indië* in 1936.

DE VOGEL in 1911 changed the Civil Medical Service into Government Health Service. He was known as " the great organizer who knitted together all Civil medical Government services into one powerful, organic body, *steeped in the scientific spirit* ".

Hygienic technique covered a wide field and the experimental station in Djatinegara in 1922 became part of the department of Sanitation and Housing of the Public Health Service, a central organization which collaborated on malaria control, removal of refuse, village and estate hygiene, etc.

In the second stage of sanitary organization many medical-statistical tests were made stimulated by VAN GORKOM's publication on *Unhealthy Batavia, past and present* (1913) which gave the results of systematic research into the causes of morbidity and mortality in a quarter of the city, in which it was shown that the mortality from tuberculosis was three times as high as that of a city such as Amsterdam.

A central, weekly registration of mortality figures has been conducted since 1919 according to the statistical method of de Vogel.

[This account, which inevitably suffers somewhat from repetition in the various sections, affords ample proof, if such were needed, of the great and lasting benefits conferred by Dutch science and Dutch medicine upon the peoples of Indonesia.]

Philip Manson-Bahr

BOOK REVIEW

CONGO BELGE : FONDS DU BIEN-ÊTRE INDIGÈNE. **Conseils d'hygiène aux Congolais.** [Instructions in Hygiene for the People of the Belgian Congo] 93 pp., 58 figs. 1950. Brussels : Bruylant.

This little book is dogmatically and clearly written, and is intended for Africans ; it would not be useful to Europeans who are already aware of the dangers of dirt and the general insanitary habits to which much of it is devoted. It is profusely illustrated by photographs and line drawings, and the text is well printed in large type freely divided into paragraphs and diversified by frequent use of bold lettering. It should be very useful in schools. General principles of cleanliness, proper food, care of infants, and the common diseases and their transmission and prevention are dealt with on conventional lines.

Charles Wilcocks

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